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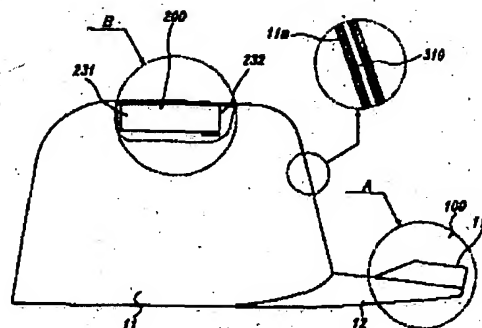
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(54) Cap having a lantern

(57) Disclosed is a cap having a lantern, which can emit light in a direction coinciding with a worker's line of vision without blocking the worker's visual field, and whose lighting direction can be adjusted, so that a worker can perform labor more easily and safely even in dark environment. The cap includes: at least a lighting section (100) disposed at a center portion of an upper surface of a visor (12); at least an electric power section (200) disposed at a cap body (11); electric power connection means (310) for interconnecting the lighting section and the electric power section with each other; and switching means (17, 18) for switching on and off electric power applied to the lighting section. The lighting section can be pivoted between a first state, in which the lighting section is in parallel with the visor, and a second state, in which the lighting section is oriented downward. Therefore, a worker can perform his labor very easily and conveniently even in a dark environment.



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## Description

### BACKGROUND OF THE INVENTION

#### Field of the Invention

[0001] The present invention relates to a cap having a lantern, and more particularly to a cap having a lantern, which can emit light in a direction coinciding with a worker's line of vision without blocking the worker's visual field, and whose lighting direction can be adjusted, so that a worker can perform labor more easily and safely even in dark environment.

#### Description of the Related Art

[0002] In general, a portable lighting apparatus such as a lantern is utilized in lighting a dark working area, so as to provide safety and convenience for the worker.

[0003] However, when he works in the dark area, for example, especially when he works in the night or when he does fishing in the night, he has to carry the lantern by one hand and perform the necessary labor. Therefore, it is very difficult and uneasy to perform the labor, and the workability is deteriorated.

[0004] In order to overcome this problem, a so-called head lantern, which can be put on a user's head, and a hanging type lantern, which can be hung on a user's pocket, have been developed.

[0005] However, the head lantern has a problem, in that it is annoying and uneasy to use the head lantern since the lantern is put on the worker's head by means of a belt while a separate battery casing is put on the worker's waist. Further, a long wire extending from the worker's head to the worker's waist may disturb the labor of the worker.

[0006] In the meantime, it is difficult to coincide the lighting direction of the hanging type lantern with the worker's line of vision. This problem is further deepened, since the hanging type lantern is apt to be oriented downward and shed light downward due to its own weight.

#### SUMMARY OF THE INVENTION

[0007] Accordingly, the present invention has been made in an effort to solve the problems occurring in the related art, and it is an object of the present invention to provide a cap having a lantern, by which a worker can perform labor easily and safely even in dark environment, simply by putting on the cap.

[0008] It is another object of the present invention to provide a cap having a lantern, which can emit light in a direction coinciding with a worker's line of vision without blocking the worker's visual field, so that a worker can perform labor more easily and safely even in dark environment.

[0009] It is another object of the present invention to provide a cap having a lantern, whose lighting direction can be adjusted, so that a worker can perform labor more easily and safely even in dark environment.

5 [0010] In accordance with one aspect of the present invention, there is provided a cap having a lantern, the cap having a cap body and a visor, the cap comprising: at least a lighting section disposed at a center portion of an upper surface of the visor; at least an electric power section disposed at the cap body; electric power connection means for interconnecting the lighting section and the electric power section with each other; and switching means for switching on and off electric power applied to the lighting section.

10 [0011] The lighting section may be maintained to be in parallel with the visor of the cap, or may be pivoted between a first state, in which the lighting section is in parallel with the visor, and a second state, in which the lighting section is oriented downward.

15 [0012] The visor of the cap may have one or more lighting sections. The lighting sections may be disposed at one or more positions of the front surface, both side surfaces, and the rear surface of the cap body.

20 [0013] Further, various arrangements of the lighting section and the electric power section are possible according to the present invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25 [0014] The above objects, and other features and advantages of the present invention will become more apparent from the following detailed description with reference to the drawings, in which:

30 FIG. 1 is a side view of a cap having a lantern according to the first embodiment of the present invention;

FIG. 2 is a front view of the cap shown in FIG. 1;

FIG. 3 is a plan view of the cap shown in FIG. 1;

FIG. 4 is an enlarged sectional view of the circled portion A in FIG. 1;

45 FIG. 5 is a longitudinal section for showing the assembly between a lighting section and a visor employed in the cap shown in FIG. 1;

50 FIG. 6 is a sectional view taken along the line C-C in FIG. 5;

FIG. 7 is a longitudinal section for showing the assembly between a lantern cover and a socket housing employed in the cap shown in FIG. 1;

55 FIG. 8 is a sectional view taken along the line D-D in FIG. 7;

FIG. 9 is a longitudinal section for showing the pivoting of a socket housing in the assembly between a lantern cover and the socket housing employed in the cap shown in FIG. 1;

FIG. 10 is an exploded side sectional view of a lamp and socket employed in the cap shown in FIG. 1;

FIG. 11 is a sectional view taken along the line E-E in FIG. 10;

FIG. 12 is a sectional view taken along the line F-F in FIG. 10;

FIG. 13 is a sectional view taken along the line G-G in FIG. 10;

FIG. 14 is a sectional view taken along the line H-H in FIG. 10;

FIG. 15 is a longitudinal side view of a socket body and nodes employed in the socket shown in FIG. 10, for showing a process of assembling them with each other;

FIG. 16 is a longitudinal side view for showing a process of assembling a socket body and an external contact member with each other employed in the socket shown in FIG. 10;

FIG. 17 is a side view of switching means employed in the lighting section shown in FIG. 4, for showing the construction and the operation thereof;

FIG. 18 is an enlarged view of a portion of the switching member shown in FIG. 17;

FIG. 19 is a longitudinal side view of an electric power section employed in the cap shown in FIG. 1;

FIG. 20 is an exploded side view of a battery case in the electric power section shown in FIG. 19;

FIG. 21 is a bottom view of the battery case shown in FIG. 20;

FIG. 22 is a side view of a cap having a lantern according to the second embodiment of the present invention;

FIG. 23 is a front view of the cap shown in FIG. 22;

FIG. 24 is a bottom view of the cap shown in FIG. 22;

FIG. 25 is a plan view of the cap shown in FIG. 22;

FIG. 26 is an enlarged partial bottom view of a

visor, to which a lighting section is attached, employed in the cap shown in FIG. 22;

FIG. 27 is an exploded side section of the lighting section employed in the cap shown in FIG. 22;

FIG. 28 is a longitudinal section of the lighting section shown in FIG. 27;

FIG. 29 is a sectional view taken along the line I-I in FIG. 28;

FIG. 30 is a sectional view taken along the line J-J in FIG. 28;

FIG. 31 is a partly cut-out side view of the lighting section shown in FIG. 27, for showing the switching operation thereof;

FIG. 32 is a longitudinal section of an electric power section employed in the cap shown in FIG. 22, for showing the mounted state thereof;

FIG. 33 is a partly exploded longitudinal section of the electric power section shown in FIG. 32;

FIG. 34 is a partly enlarged bottom view of a visor of the cap having a lantern according to the third embodiment of the present invention, to which a lighting section is attached;

FIG. 35 is a longitudinal section of a socket housing employed in the cap shown in FIG. 34, in which the socket housing is oriented downward;

FIG. 36 is a side sectional view of a modified electric power section according to the present invention;

FIG. 37 is a side view of a cap having a lantern according to another embodiment of the present invention, which has another arrangement of the electric power section;

FIG. 38 is a perspective view of a cap having a lantern according to another embodiment of the present invention, which has another arrangement of the electric power section;

FIGs. 39 to 42 are plan views of caps having a lantern according to other embodiments of the present invention, which show various arrangements of the electric power sections;

FIGs. 43 to 54 are plan views of caps having a lantern according to other embodiments of the present invention, which show various arrangements of the electric power sections and the lighting sections;

FIG. 55 is a side view of a cap having a lantern according to another embodiment of the present invention;

FIG. 56 is a front view of the cap shown in FIG. 55;

FIG. 57 is a plan view of the cap shown in FIG. 55;

FIG. 58 is an enlarged sectional view of the circled portion B in FIG. 55;

FIG. 59 is an exploded sectional view of a lighting section and a socket employed in the cap shown in FIG. 55;

FIG. 60 is a sectional view taken along the line K-K in FIG. 58;

FIG. 61 is a sectional view taken along the line L-L in FIG. 58; and

FIG. 62 is a sectional view taken along the line M-M in FIG. 58.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0015] The above and other objects, characteristics, and advantages of the present invention will become apparent from the following description along with the accompanying drawings.

[0016] Hereinafter, described in detail will be several preferred embodiments of the present invention, with reference to the accompanying drawings.

[0017] FIGs. 1 to 3 show a cap having a lantern according to a first embodiment of the present invention, in which reference numerals 11 and 12 respectively designate a cap body and a visor.

[0018] In the cap according to the present embodiment, as shown in FIG. 1, the cap body 11 is made by laminating a plurality of textile sheets 11a and forming them to have a shape of a hemisphere, and the visor 12 contains a core material 12a made of a relatively hard material such as a synthetic resin. The present invention is not restricted by the present embodiment, but can employ any shape comprising a cap body and a visor. In FIG. 1, reference numeral 11b designates a seam line of the cap body 11.

[0019] The cap having a lantern according to the first embodiment of the present invention includes, as shown in FIGs. 1 to 4, a lighting section 100 disposed on a central upper portion of the visor 12, an electric power section 200 disposed at a central portion of the cap body 11, electric power connection means for electrically interconnecting the lighting section 100 and the electric power section 200 to each other, and switching means for switching on and off the electric power applied to the lighting section 100.

[0020] The lighting section 100 includes a lantern cover 110 fixed onto a center portion of an upper surface of the visor 12, a socket housing 120 contained in the lantern cover 110, a socket 130 fixed in the socket housing 120, a lamp 140 fitted in the socket 130, a reflection mirror 150 disposed surrounding the lamp 140, a transparent protection window 160 disposed in front of the reflection mirror 150, and a front end cover 170 for assembling the reflection mirror 150 and the transparent protection window 160 with the socket housing 120.

[0021] The lantern cover 110 has a section having a shape similar to the letter U whose lower and front faces are open, and covers over a socket housing operation hole 13 formed at the middle of the visor 12.

[0022] A wire fixing recess 112 is formed inside of a rear end of the lantern cover 110, so as to fix an electric wire 310, which is an element of the electric power connection means, which will be described later in the specification.

[0023] The lantern cover 110 may be made from metal, or may be preferably made by injection-molding synthetic resin.

[0024] FIGs. 5 and 6 show fixing screws 111 screwed upward from the lower side onto a lower surface of a main wall of the lantern cover 110 near the socket housing operation hole 13 of 12, by which the present invention is not restricted, but can employ other assembling means utilizing rivets, adhesive, ultrasonic wave, radio frequency wave, etc. Further, a plurality of protuberances may be formed on the lower surface of the main wall of the lantern cover 110, and be inserted downward from the upper side through a portion near the socket housing operation hole 13 of 12, and then the lower ends of the protuberances are melted to be expanded, so that the lantern cover 110 is fixed.

[0025] Besides, in the case where the visor 12 is made from synthetic resin, the lantern cover 110 may be integrally formed with the visor 12 while the visor 12 is formed.

[0026] A hinge groove 113 is formed at both sides of an inner peripheral surface of the rear end of the lantern cover 110, so as to pivotally support the socket housing 120.

[0027] The socket housing 120 has a shape of a cylinder whose front end rear ends are open. The socket housing 120 has a male screw portion 121 formed at an outer surface of the front end thereof and a first partition wall 122 disposed at the rear end thereof and having a first through hole 123 formed at a center of the first partition wall 122. The first partition wall 122 has a cylindrical socket supporting protuberance 124 and a printed circuit board (PCB) mounting groove the PCB mounting groove 125 respectively formed at front and rear surfaces thereof.

[0028] It is preferred that hinge protuberances 126 are formed at both sides of an outer surface of the rear end of the socket housing 120. The hinge protuber-

ances 128 are inserted in the hinge groove 113 formed at both sides of an inner surface of the rear end of the lantern cover 110, so that the socket housing 120 can be pivoted between a lay state, in which the socket housing 120 is located in parallel with the visor 12 as shown in FIG. 7, and an upright state, in which the socket housing 120 is located perpendicular to the visor 12 as shown in FIG. 9.

[0029] The hinge groove 113 and the hinge protuberances 126 are forcedly engaged with each other, so that the socket housing 120 cannot be pivoted of itself by the weight of the socket housing 120 together with elements contained therein.

[0030] At a lower portion of the outer surface of the socket housing 120 is formed a switch knob guiding hole 127 in which a switch knob 410 of the switching means, which will be described in detail later in this specification, is slidably disposed.

[0031] The socket 130 includes a socket body 131 made from a non-conductive material and inserted in the socket housing 120, a pair of nodes 132 and 133 made from conductive material and inserted in the socket body 131, and an external contact member 134 electrically interconnected to one of the nodes 132 and 133.

[0032] The nodes 132 and 133 include lead receiving pieces 132a and 133a, into which leads 141 and 142 of the lamp 140 are inserted, and electric power connection pieces 132b and 133b respectively extending backward from the lead receiving pieces 132a and 133a.

[0033] The nodes 132 and 133 are bent to have a shape similar to the letter U, so that the leads 141 and 142 of the lamp 140 can be inserted into them to make electric interconnections.

[0034] The socket body 131 includes node fixing recesses 131a and 131b, into which the lead receiving pieces 132a and 133a of the nodes 132 and 133 are inserted and fixed, and second through holes 131c and 131d formed behind the node fixing recesses 131a and 131b, through which the electric power connection pieces 132b and 133b are inserted.

[0035] The node fixing recesses 131a and 131b are electrically insulated by a second partition wall 131e, and the second through holes 131c and 131d are electrically insulated by a supporting protuberance 131f protruding backward from the socket body 131.

[0036] The electric power connection pieces 132b and 133b are in a straightly extending state as shown in FIG. 10 before they are assembled with the socket body 131. On the contrary, when the nodes 132 and 133 have been assembled with the socket body 131, the electric power connection pieces 132b and 133b are bent so that the electric power connection piece 132b of the first node 132 is in contact with a rear end of the socket body 131, and the electric power connection piece 133b of the second node 133 is in contact with a rear end of the supporting protuberance 131f, as shown in FIG. 15.

[0037] The external contact member 134 has a shape of a cup whose front end is open and whose rear end is a rear end portion 134a having a third through hole 134b formed at the center of the rear end portion 134a.

[0038] The rear end portion 134a is interconnected to the electric power connection piece 132b of the first node 132, which is then inserted through the third through hole 134b without being in contact with the third through hole 134b.

[0039] The external contact member 134 has a fixing piece 134c formed at a front end of the external contact member 134. The fixing piece 134c is inserted through a fixing hole 131h formed at a flange 131g of the socket body 131, and then is bent so that the external contact member 134 is assembled with the socket body 131.

[0040] An OFF-state maintaining protuberance 134d for maintaining a moving node 420 of the switching means at an OFF state is formed at an outer surface of the external contact member 134.

[0041] The PCB mounting groove the PCB mounting groove 125, in which a printed circuit board (PCB) 320 is inserted, is covered with a rear end cover 180 so as to protect the PCB 320.

[0042] Meanwhile, a position determining protuberance 128 is formed at an upper portion of an inner surface of the socket housing 120, and a position determining groove 131i is formed at an upper portion of an outer surface of the flange 131g of the socket 130, which corresponds to the position determining protuberance 128.

[0043] The reflection mirror 150, the transparent protection window 160, and the front end cover 170 are the types employed in a usual flashlight.

[0044] The front end cover 170 is formed on an inner surface of the front end cover 170, so as to be engaged with the male screw portion 121 formed on the socket housing 120.

[0045] An inward flange 172 extends inward from the front end of the front end cover 170, and defines a projection hole 173 at the center thereof, and a packing 190 is fitted between the inward flange 172 and the transparent protection window 160 so as to prevent entrance of water.

[0046] As shown in FIGs. 19 to 21, the electric power section 200 includes a battery casing 210 fixed at an inner center portion of the cap body 11 and having a battery entrance 213 formed at a lower face of the battery casing 210, and a first lid 220 for opening and closing the battery entrance 213 of the battery casing 210.

[0047] The battery casing 210 has a construction in which a usual battery B can be received, and is made from synthetic resin by an injection molding. Although the battery casing 210 may be formed to have a single integral body, it is preferred that the battery casing 210 is formed to include an upper casing 211 having an open lower face and a lower casing 212 having an open

upper face and the battery entrance 213 formed at a lower surface of the lower casing 212. In this case, the upper casing 211 and the lower casing 212 are assembled together and then the battery casing 210 is attached, so that only the battery entrance 213 is open.

[0048] The upper casing 211 and the lower casing 212 are attached to each other by means of adhesive, ultrasonic wave, or radio frequency wave.

[0049] Battery contact nodes 214 and 215, with which electrodes of the battery B are in contact, are provided in the upper casing 211.

[0050] A front end engagement groove 216 is formed at an inner surface of a front end of a lower plate of the lower casing 212, and rear end engagement grooves 217 are formed at both sides of a rear end thereof. A hook 221 having a front end engagement protuberance 222 to be engaged with the front end engagement groove 216 is formed at a front end of the first lid 220, a rear end engagement protuberance 223 to be engaged with the rear end engagement grooves 217 are formed at both sides of a rear end of the first lid 220.

[0051] As electric power section fixing means for fixing the battery casing 210 to the inner surface of a central portion of the cap body 11, screws or rivets may be utilized to directly fix the upper casing 211 onto the inner surface of the central portion of the cap body 11. It is preferred that the electric power section fixing means includes a pocket 231 having an open front end and a second lid 232 for opening and closing the open front end of the pocket 231. In this case, the electric power section 200 is inserted in the pocket 231 and the second lid 232 is covered over the front end, so that the electric power section 200 is fixed.

[0052] Further, the pocket 231 may be made from the same material as that of the textile sheets 11a of the cap body 11. However, it is preferred that the pocket 231 is made of a cloth having a cushioning material such as a sponge, so as to prevent a pressure from being felt on a wearer's vertex.

[0053] The pocket 231 and the second lid 232 are attached to the cap body 11 by means of sewing.

[0054] It is preferred that the pocket 231 and the second lid 232 are attached to and detached from each other by means of fasteners 233 and 234, which are found as a trademark of "Velcro" on the market.

[0055] As shown in FIG. 4, the electric power connection means includes the electric wire 310 respectively interconnected to the battery contact nodes 214 and 215 of the battery casing 210 and drawn out forward therefrom, the PCB 320 inserted in the PCB mounting groove the PCB mounting groove 125 formed at a rear end of the socket housing 120 and electrically interconnected to the electric wire 310, an elastic node 330 electrically interconnected to a central portion of the PCB 320 and inserted into the socket supporting protuberance 124 to be in contact with the electric power connection piece 133b of the second node 133, and a

fixed node 340 electrically interconnected to an edge of a side of the PCB 320 and supported by an outer surface of the socket supporting protuberance 124.

[0056] Both ends of the electric wire 310 are respectively attached to the battery contact nodes 214 and 215 of the battery casing 210 and a circuit pattern (not shown) of the PCB 320 by sold ring. In this case, the electric wire 310 may be distributed through the inner surface of the cap body 11 and the lower surface of 12, and more preferably may be distributed through the interior of the textile sheets 11a of the cap body 11 and between the core material 12a and the textile sheet 12b, as shown in FIGs. 1, 2, and 9.

[0057] A cord bushing 311 is assembled with a middle portion of the electric wire 310, and the wire fixing recess 112 inserted in the cord bushing 311 is formed at a portion of an inner surface near the rear end of the lantern cover 110.

[0058] FIG. 4 shows the elastic node 330 having a conical coil spring shape, by which the present invention is not restricted, but can employ a shape of a leaf spring.

[0059] The switching means includes, as shown in FIGs. 4, an inner cloth 17, and a pocket 18, the switch knob 410 inserted in the switch knob guiding hole 127 of the socket housing 120 with being slidable forward and backward therein, and the moving node 420 fixed to the switch knob 410 so as to electrically interconnecting and isolating the external contact member 134 and the fixed node 340 to and from each other.

[0060] The switch knob 410 includes a guide portion 411 slidably inserted in the switch knob guiding hole 127 and a knob portion 412 formed integrally with the guide portion 411 and protruding downward of the outer surface of the socket housing 120.

[0061] The moving node 420 has a width larger than that of the switch knob guiding hole 127. The moving node 420 is fixed to the guide portion 411 by means of a fixing screw 421.

[0062] Hereinafter, described will be an assembling process for a cap having a lantern according to a first embodiment of the present invention.

[0063] As shown in FIG. 15, in a state where the electric power connection pieces 132b and 133b of the nodes 132 and 133 are oriented backward, the nodes 132 and 133 are inserted through the node fixing recesses 131a and 131b of the socket body 131 from the front of the socket 130. Then, the electric power connection pieces 132b and 133b are inserted through the second through holes 131c and 131d so that their rear ends protrude backward out of the second through holes 131c and 131d, and the lead receiving pieces 132a and 133a are inserted in the node fixing recesses 131a and 131b. Thereafter, the protruding rear ends of the electric power connection pieces 132b and 133b are bent, so that the bent portion of the electric power connection piece 132b is in close contact with the rear end of the main wall of the socket body 131 and the bent



portion of the second node 133 is in close contact with the rear end of the supporting protuberance 131f of the socket body 131.

[0064] As shown in FIG. 16, the socket body 131 assembled with the nodes 132 and 133 as described above is covered with the external contact member 134, and the fixing piece 134c of the external contact member 134 is fitted through the fixing hole 131h formed at the flange 131g of the socket body 131 and then is bent outward, so that the socket body 131 is assembled with the external contact member 134.

[0065] In this case, the bent portion of the lead receiving piece 132a is in contact with the rear end portion 134a of the external contact member 134, and the bent portion of the lead receiving piece 133a is not in contact with the external contact member 134 but is drawn out through the third through hole 134b formed at the rear end portion 134a of the external contact member 134.

[0066] Then, the guide portion 411 of the switch knob 410 is inserted in the switch knob guiding hole 127 of the socket housing 120 and the moving node 420 is inserted in the socket housing 120, and then the fixing screw 421 is inserted through the moving node 420 and screwed into the guide portion 411, so that the switching means is assembled with the socket housing 120.

[0067] In this case, the switching means is not separated unexpectedly, since the moving node 420 of the switching means has a width larger than that of the switch knob guiding hole 127.

[0068] Thereafter, one end of the electric wire 310 is connected to the battery contact nodes 214 and 215 of the battery casing 210 by soldering, and the other end of the electric wire 310 is fixed to the PCB 320 by soldering. The battery casing 210 is inserted in the pocket 231 attached to the inner surface of the central portion of the cap body 11, and the second lid 232 is closed. Then, the electric wire 310 is inserted in the seam line 11b of the textile sheets 11a of the cap body 11 and between the core material 12a and the textile sheet 12b, and the PCB 320 is inserted in the PCB mounting groove 125 of the socket housing 120. Thereafter, the elastic node 330 is inserted in the socket housing 120 from the front of the socket housing 120 and is connected to the PCB 320 by soldering, and the rear end cover 180 is covered over the PCB mounting groove 125, so as to protect the PCB 320.

[0069] In this case, the cord bushing 311 assembled on the electric wire 310 is fitted into the wire fixing recess 112 formed at the socket housing 120, so as to prevent the electric wire 310 from freely moving and from being drawn forward and backward.

[0070] Then, an assembly of the socket 130, the nodes 132 and 133, and the external contact member 134 is inserted into the socket housing 120 from the front thereof, so that the outer surface of the external contact member 134, which is in contact with the elec-

tric power connection piece 132b of the first node 132, comes into contact with the moving node 420 of the switching means, and the electric power connection piece 133b of the second node 133 inserted through the third through hole 134b formed at the rear end portion 134a of the external contact member 134 comes into contact with the elastic node 330.

[0071] In this case, since the position determining protuberance 128 and the position determining groove 131i corresponding to each other are respectively formed at the inner surface of the socket housing 120 and at the outer surface of the flange 131g of the socket body 131, the relative position of the socket body 131 with respect to the socket housing 120 is always maintained constantly, and the assembled state of the socket 130 with the socket housing 120 is not unexpectedly changed, after they are assembled with each other.

[0072] Next, the leads 141 and 142 are inserted in the lead receiving pieces 132a and 133a of the nodes 132 and 133 assembled with the socket body 131, and the reflection mirror 150 is fitted in a front portion of the socket body 131. Then, the front end cover 170, in which the transparent protection window 160 is fitted, is assembled by means of the male screw portion 121 and a female screw portion 171.

[0073] In this case, the packing 190 fitted between the transparent protection window 160 and the inward flange 172 of the front end cover 170 prevents entrance of water.

[0074] Finally, the hinge protuberances 128 formed at both ends of the outer surfaces of the rear end of the socket housing 120 are fitted in the hinge groove 113 formed at both sides of the inner surface of the rear end of the lantern cover 110, so that the entire assembling process is completed.

[0075] The cap having a lantern according to the first embodiment of the present invention does not have to be assembled according to the above order, but may be assembled according to other methods or orders depending on assembling conditions.

[0076] When the battery B is received in the battery casing 210, in a state that the battery casing 210 is put out of the pocket 231, the front end of the first lid 220, at which the hook 221 is formed, is pressed upward, so that the front end engagement protuberance 222 of the hook 221 is released from the front end engagement groove 218 of the battery casing 210. In this state, the first lid 220 is pushed backward, so that both walls of the battery casing 210 are slightly widened due to its own elasticity and the rear end engagement protuberance 223 is released from the rear end engagement grooves 217, thereby opening the battery entrance 213. Thereafter, the battery B is inserted in the battery casing 210, and then the first lid 220 is inserted forward from the rear side thereof. When the front end engagement protuberance 222 of the hook 221 comes close to the front end engagement groove 218, the hook 221 is slightly bent upward and then restored, so as to make the front

end engagement protuberance 222 be fitted in the front end engagement groove 216. Also, when the rear end engagement protuberance 223 comes close to the rear end engagement grooves 217, both side walls of the battery casing 210 are slightly widened due to its own elasticity, and then are elastically restored when the rear end engagement protuberance 223 reaches a position corresponding to the rear end engagement grooves 217, so that the rear end engagement protuberance 223 is fitted in the rear end engagement grooves 217. Then, the first lid 220 is closed while blocking the battery entrance 213.

[0077] When the switch knob 410 of the switching means is pushed backward after the battery casing 210 containing the battery B is inserted in the pocket 231 and is covered with the second lid 232, both ends of the moving node 420 connected to the switch knob 410 come into contact with the external contact member 134 and the fixed node 340. Then, electricity is applied to the lamp 140 from the battery B through a closed circuit comprising the battery contact node 214, the electric wire 310, a pattern of the PCB 320, the fixed node 340, the moving node 420, the external contact member 134, the first node 132, the lead 141 of the lamp 140, a filament of the lamp 140, the lead 142, the second node 133, the elastic node 330, the pattern of the PCB 320, the electric wire 310, and the battery contact node 215. The light emitted from the lamp 140 is reflected by the reflection mirror 150 and shed through the transparent protection window 160.

[0078] In this case, as shown in FIGs. 1 to 4, when a wearer puts on the cap in a lay state thereof, in which the socket housing 120 is disposed in parallel with 12, the lamp 140, the reflection mirror 150, the transparent protection window 160, and the front end cover 170 are oriented forward, and the light emitted from the lamp 140 is shed forward. In this case, since the lighting section 100 is disposed on the upper surface of the center portion of 12, the light-shedding direction coincides with the wearer's line of vision, so that the lighting section 100 can shed light exactly on a subject.

[0079] Further, since the lighting section 100 is disposed on the upper surface of the center portion of 12, the wearer's field of vision is not covered by the lighting section 100. Moreover, when the wearer turns his field of vision right and left, the light-shedding direction of the lighting section 100 is turned together, so that the light-shedding direction can always coincide with the wearer's line of vision.

[0080] Meanwhile, when the wearer's line of vision is oriented downward, for example, when the wearer is putting a bait on a hook or separating the hook from a caught fish, in the course of fishing in the night, the front end of the socket housing 120 is pulled downward, so that the entire socket housing 120 is pivoted downward about the hinge protuberances 126 formed at the socket housing 120 and the hinge groove 113 formed at the lantern cover 110 as shown by the phantom line in FIG.

9, to make the shedding direction of the light emitted from the lamp 140 be oriented downward. Therefore, the wearer can perform his labor more conveniently.

[0081] Further, although the phantom line in FIG. 9 shows only one state in which the socket housing 120 is pivoted by ninety degrees, the socket housing 120 may be optionally pivoted by a desired angle between its lay state and upright state.

[0082] In order to extinguish the lamp 140, the switch knob 410 is pushed forward to make the rear end of the moving node 420 be escaped out of the fixed node 340, so that the electric power to the lamp 140 is cut off and the lamp 140 is extinguished.

[0083] In this case, the front end of the moving node 420 is moved forward beyond the OFF-state maintaining protuberance 134d protruding from an outer surface of the external contact member 134. In this state, the moving node 420 is not moved backward even though an external impact is applied thereto, so as to maintain the electric power extinguished state, which is not released before the user pushes the switch knob 410 backward.

[0084] In the meantime, since the pocket 231, in which the battery casing 210 of the electric power section 200 is received, is made of a cloth having a cushioning material such as a sponge, the pressure felt on the wearer's vertex by the weight of the battery casing 210 and the battery B is minimized.

[0085] Further, though not shown, instead of 13, a switch knob nozzle hole, through which the socket housing 120 cannot be passed, but only the switch knob 410 can be exposed, is formed at 12, so that the socket housing 120 is maintained always in parallel with the visor 12.

[0086] FIGs. 22 to 33 show a cap having a lantern according to a second embodiment of the present invention. In FIGs. 22 to 25, reference numerals 11 and the visor 12 respectively designate a cap body and a visor.

[0087] The cap having a lantern according to the second embodiment of the present invention includes, as shown in FIGs. 22 to 25, a lighting section 500 disposed on a central upper portion of 12, an electric power section 600 disposed at a central portion of the cap body 11, electric power connection means for electrically interconnecting the lighting section 500 and the electric power section 600 to each other, and switching means for switching on and off the electric power applied to the lighting section 500.

[0088] The visor 12 has a switch knob exposing hole 14, through which a switch knob 810 of the switching means is exposed, and a through hole 15, in which a retainer 516 is fitted. The switch knob exposing hole 14 has a transverse section smaller than that of a socket housing 520.

[0089] The lighting section 500 includes a lantern cover 510 fixed onto a center portion of an upper surface of 12, a socket housing 520 contained in the lan-



tern cover 510, a lamp 530 inserted in the socket housing 520, a reflection mirror 540 disposed surrounding the lamp 530, and a transparent protection lid 550 disposed in front of the reflection mirror 540.

[0090] The lantern cover 510 has a section having a shape similar to the letter U whose lower and front faces are open; and is assembled with the upper surface of the central portion of the visor 12.

[0091] The lantern cover 510 may be made from metal, or may be preferably made by injection-molding synthetic resin.

[0092] In order to assemble the lantern cover 510 with the visor 12, as shown in FIGs. 27 to 29, four bosses 511 are formed at opening surfaces of an inner lower portion of the lantern cover 510, and fixing screws 512 penetrating upward through the visor 12 from the lower surface are assembled with the bosses 511. However, the present invention is not restricted by this assembly.

[0093] A hinge protuberance 513 for pivotally supporting the socket housing 520 is formed at inner surfaces of both side walls of the lantern cover 510.

[0094] A wire fixing recess 514 having an open lower end is formed inside of a rear end of the lantern cover 510, and the retainer 516 is fitted in a lower end of the wire fixing recess 514.

[0095] A retainer holding rib 515 for fixing the retainer 516 is formed at the wire fixing recess 514, and a supporting bracket 517 for holding a wire connector 740 of the electric power connection means is formed at the retainer 516.

[0096] The socket housing 520 has a shape of a cylinder whose front end rear ends are open. The socket housing 520 has a socket portion 521 in which a rear end of the lamp 530 is inserted, a male screw portion 522 formed at an outer surface of a front end of the socket housing 520, a hook hole 523 formed at a main wall of a rear end of the socket housing 520, and a switch knob guiding hole 524 formed at a portion of the main wall corresponding to the socket portion 521, in which the switch knob 810 of the switching means is slidably fitted.

[0097] A board assembling protuberance 525 for assembling a PCB 720 is formed at a rear end portion of the socket portion 521. A rear end lid 526 is assembled with a rear end portion of the socket housing 520 and has an elastic hook 527 engaged with the hook hole 523. At the rear end lid 526 is formed a wire hole 528a through which a socket-side electric wire 730 extends. A node supporting groove 528 for supporting a fixed node 800 is formed at an outer surface of a lower portion of the socket portion 521. At both sides of the socket housing 520 are formed a hinge groove 529 in which are fitted the hinge protuberance 513 formed at an inner surface of the lantern cover 510.

[0098] The lamp 530 includes a bulb 531 containing a filament, a rear end node 532 electrically interconnected to one end of the filament, a lateral node 533

electrically interconnected to the other end of the filament, and a flange 534 formed at a middle portion of the lateral node 533.

[0099] The socket portion 521 has a shape of a cylinder whose front and rear ends are open, and has an annular lamp seat 521a formed at an inner surface of a front end of the socket portion 521, into which the rear end portion of the lamp 530 after the flange 534 can be inserted.

[0100] The reflection mirror 540 has a reflective inner surface in which the bulb 531 of the lamp 530 is inserted.

[0101] The transparent protection lid 550 has a front light-transmitting portion 551 and a cylindrical portion 552. The cylindrical portion 552 has a cylindrical shape extending backward from the front light-transmitting portion 551 and having an open rear end.

[0102] Both of the front light-transmitting portion 551 and the cylindrical portion 552 of the transparent protection lid 550 may be transparent or only the front light-transmitting portion 551 may be transparent.

[0103] At an inner end of the cylindrical portion 552 of the transparent protection lid 550 is formed a female screw portion 553, which is engaged with the male screw portion 522 formed at the outer surface of the front end of the socket housing 520.

[0104] Between the socket housing 520 and the transparent protection lid 550 is inserted an O-ring 554 for preventing entrance of water and foreign material.

[0105] As shown in FIGs. 32 and 33, the electric power section 600 includes a battery casing 610 having a battery receiving space 611 both ends of which are open, a pair of stoppers 620 capped on both ends of the battery casing 610, spring nodes 630 being assembled with inner side surfaces of the stoppers 620 and being in contact with terminals of the battery B received in the battery receiving space 611.

[0106] The stoppers 620 has a shape of a cup, which includes an end wall 621 blocking both opening ends of the battery casing 610 and assembling portions 622 extending inward from the end wall 621 to be put on outer surfaces of the opposite ends of the battery casing 610.

[0107] Stopper engagement grooves 612 are formed at the outer surfaces of the opposite ends of the battery casing 610, and engagement protuberances 623 engaged with the stopper engagement grooves 612 are formed at the assembling portions 622 of the stoppers 620.

[0108] At the outer surfaces of the opposite ends of the battery casing 610 are formed an O-ring groove 613, in which are inserted an O-ring 640 for preventing water and foreign material from coming into the interior through the gap between the outer surfaces of the stoppers 620 and the inner surfaces of the assembling portions 622.

[0109] Spring holding protuberances 624 for fixing the spring nodes 630 are formed at the inner surfaces of

the end wall 621 of the stoppers 620, and wire guiding holes 625, through which a power source-side electric wire 700 fixed by soldering to the spring nodes 630 extends, are formed at the end wall 621.

[0110] When the battery casing 610 is assembled with the cap body 11, as shown in FIG. 32, a screw boss 614 is formed at a central portion of the outer surface of the battery casing 610 and is tightly attached on the inner surface of the cap body 11. Then, a washer 615 having a screw hole 616 corresponding to the screw boss 614 is tightly attached on the outer surface of the cap body 11. In this state, a fixing screw 617 is inserted through the screw hole 616 and screwed into the screw boss 614, so that the battery casing 610 is assembled with the cap body 11. An annular protrusion 618 is formed around the screw boss 614, so as to enlarge the area to be in contact with the cap body 11. An ornamental lid 619 is put on the washer 615, so that the fixing screw 617 is not exposed to the exterior.

[0111] Further, a hook groove 615a is formed at an outer surface of the washer 615, and a hook 619a is formed at an inner surface of the ornamental lid 619. When the ornamental lid 619 is covered on the washer 615, the hook 619a is fitted in the hook groove 615a so as to prevent the ornamental lid 619 from being separated from the washer 615.

[0112] The electric power connection means includes the power source-side electric wire 700 fixed by soldering to the spring nodes 630 assembled with the stoppers 620 of the electric power section 600 and extending through the wire guiding holes 625 formed at the end wall 621 of the stoppers 620, a socket-side spring node 710 inserted in the socket portion 521 of the lighting section 500 to be in contact with the rear end node 532 of the lamp 530, the PCB 720 assembled with the rear end of the socket portion 521 and connected to the socket-side spring node 710 fixed by soldering to the PCB 720, the socket-side electric wire 730 fixed by soldering to the PCB 720, and a pair of the wire connector 740 for interconnecting the power source-side electric wire 700 and the socket-side electric wire 730 with each other.

[0113] The power source-side electric wire 700 extends toward the visor 12 while being inserted in the seam line 11b of the textile sheets 11a forming the cap body 11, and then extends through the gap between the core material 12a and the textile sheet 12b into the wire fixing recess 514 of the lantern cover 510, in the visor 12.

[0114] The socket-side spring node 710 is fixed by soldering to the PCB 720 while being electrically connected to one strand of the socket-side electric wire 730.

[0115] At the PCB 720 is formed an assembling hole 731, in which is fitted the board assembling protrusion 525 formed at a rear end portion of the socket portion 521.

[0116] The power source-side electric wire 700 and

the socket-side electric wire 730 respectively have two strands thereof. When the two strands of the socket-side electric wire 730 are fixed by soldering to the PCB 720, they are respectively fixed to two different positions so as to prevent them from being electrically interconnected to each other, and one strand of the socket-side electric wire 730 is fixed by soldering in such a manner to be electrically interconnected to the socket-side spring node 710.

[0117] The switching means includes, as shown in FIGs. 26 to 31, the fixed node 800 fixed to the PCB 720 by soldering to be electrically interconnected to the other strand of the socket-side electric wire 730 which is not interconnected to the socket-side spring node 710, the switch knob 810 being slidably inserted in the switch knob guiding hole 524 of the socket housing 520 and being exposed to the lower side through the switch knob exposing hole 14 formed at 12, and a moving node 820 fixed to the switch knob 810 so as to electrically interconnecting and isolating the lateral node 533 of the lamp 530 and the fixed node 800 with and from each other.

[0118] When the switch knob 810 and the moving node 820 are assembled together, a screw passing through the moving node 820 may be assembled with the switch knob 810. Otherwise, it is preferred that the moving node 820 made from metal is closely attached onto the switch knob 810 made from synthetic resin, and then the switch knob 810 is partially melted, so that the switch knob 810 is assembled with the moving node 820.

[0119] The fixed node 800 is made from conductive metal and is inserted in the node supporting groove 528 of the socket portion 521.

[0120] Preferably, both ends of the moving node 820 are bent so as to elastically come into contact with the lateral node 533 of the lamp 530 and the fixed node 800.

[0121] Hereinafter, described will be a process for assembling a cap having a lantern according to the second embodiment of the present invention.

[0122] In a state as shown in FIG. 27, the bulb 531 of the lamp 530 is oriented forward and is inserted into the socket housing 520 from the front of the socket housing 520, until the rear end node 532 and a portion of the rear end of the lateral node 533 is inserted in the socket portion 521.

[0123] Then, the reflection mirror 540 is inserted into the socket housing 520 from the front of the socket housing 520, so that the bulb 531 of the lamp 530 is surrounded by the reflection mirror 540. Thereafter, the transparent protection lid 550 is assembled at the front end of the socket housing 520. In this case, the socket housing 520 and the transparent protection lid 550 are assembled together by means of screw assembly between the male screw portion 522 and the female screw portion 553. The O-ring 554 is interposed between the front end of the socket housing 520 and the

transparent protection lid 550, so as to prevent entrance of water and foreign material.

[0124] The PCB 720, in which the socket-side electric wire 730, the socket-side spring node 710, and the fixed node 800 are fixed by soldering, is inserted in the socket housing 520 from the rear side of the socket housing 520 and assembled with the rear end of the socket portion 521. In this case, the board assembling protuberance 525 of the socket portion 521 is fitted in the assembling hole 731 of the PCB 720, so that the PCB 720 is assembled with an exact position of the socket housing 520. The socket-side spring node 710 is inserted in the socket portion 521 to be in contact with the rear end node 532 of the lamp 530.

[0125] The rear end lid 526 is assembled with the rear end of the socket housing 520. In this case, the elastic hook 527 is elastically fitted in the hook hole 523 formed at the rear end of the socket housing 520, so as to prevent the rear end lid 526 from being separated therefrom.

[0126] The moving node 820 of the socket housing 520 is inserted through the switch knob guiding hole 524 into the socket housing 520, so that one end of the moving node 820 is in contact with the fixed node 800 and the other end of the moving node 820 is in contact with the lateral node 533 of the lamp 530. At the same time, the switch knob 810, with which the moving node 820 is assembled, is disposed in such a manner that the switch knob 810 can be slid forward and backward in the switch knob guiding hole 524.

[0127] The socket housing 520 is inserted in the lantern cover 510 while the hinge protuberance 513 formed in the lantern cover 510 is fitted in the hinge groove 529 formed at the socket housing 520, so that the socket housing 520 is assembled with the lantern cover 510.

[0128] In this case, the socket-side electric wire 730 is drawn out to the wire fixing recess 514 through the wire hole 528a formed at the rear end lid 526.

[0129] Meanwhile, as shown in FIGs. 32 and 33, the screw boss 614 formed at the battery casing 610 is tightly attached on the lower surface of the cap body 11 of the cap 10 and the washer 615 is tightly attached on the upper surface of the cap body 11 corresponding to the lower surface, and then the fixing screw 617 is inserted through the screw hole 616 formed at the washer 615 and is assembled at the screw boss 614, so that the electric power section 600 is assembled with the cap body 11. In this case, since the annular protrusion 618 is formed around the screw boss 614, the battery casing 610 is more stably fixed.

[0130] Further, the ornamental lid 619 is capped on the washer 615, so as to prevent the fixing screw 617 from being exposed to the exterior, thereby improving aesthetic value of the external appearance thereof. In this case, the washer 615 and the ornamental lid 619 are assembled together by means of the hook groove 615a formed at the outer surface of the wire fixing

recess 514 and the hook 619a formed at the inner surface of the ornamental lid 619.

[0131] When the battery B is received in the battery casing 610, the stoppers 620 on the side is separated from the battery casing 610, and the battery B is inserted in the battery receiving space 611 through the open end of the battery casing 610 from which the stoppers 620 is separated. Then, the separated the stoppers 620 is put on again. Both ends of the battery B received in the battery receiving space 611 elastically contact with the spring nodes 630. Further, a process similar to the above may be employed when the battery is replaced. In this case, the battery casing 610 and the stoppers 620 are not unexpectedly separated from each other, but are tightly assembled with each other by means of the stopper engagement groove 612 formed at the outer surface of the battery casing 610 and the engagement protuberances 623 formed at the inner surfaces of the assembling portions 622 of the stoppers 620. Further, the O-ring 640 fitted between the inner surfaces of the assembling portions 622 of the stoppers 620 and the outer surfaces of the opposite ends of the battery casing 610 prevents water and foreign material from coming thereinto.

[0132] The power source-side electric wire 700 extends outward through the spring holding protuberances 624 formed at the stoppers 620, of the electric power section 600 up to the wire fixing recess 514 while being inserted in the textile sheets 11a and the seam line 11b. The power source-side electric wire 700 and the socket-side electric wire 730 are connected to each other by means of the wire connector 740.

[0133] Next, as described above, the lantern cover 510, with which the socket housing 520 and the lamp 530 are assembled, is located at the center of the upper surface of 12, and fixing screws 512 are inserted upward from the lower side through the visor 12 and screwed into the bosses 511 of the lantern cover 510, so that the lighting section 500 is fixedly assembled with the visor 12. In this case, the switch knob 810 is disposed at the switch knob exposing hole 14 of the visor 12.

[0134] The retainer 516 is inserted in the wire fixing recess 514 through the through hole 15 formed at 12, so that the retainer 516 is supported by the retainer holding rib 515. In this state, the fixing screw 512 for fixing the lantern cover 510 is inserted through the retainer 516 and assembled with the bosses 511, so that the retainer 516 is fixed together with the lantern cover 510. In this case, the wire connector 740 is supported by the supporting bracket 517 formed at the retainer 516.

[0135] The cap having a lantern according to the second embodiment of the present invention does not have to be assembled according to the above order, but may be assembled according to other methods or orders depending on assembling conditions.

[0136] When a user puts on the cap having a lantern according to the second embodiment of the present

invention as described above, the lighting section 500 is always oriented forward at the center of the user's visual field.

[0137] When the switch knob 810 is pushed forward as shown by the phantom line in FIG. 31, the front end of the moving node 820 is in contact with the lateral node 533 of the lamp 530, while the rear end of the moving node 820 is separated from the fixed node 800, so that electric power from the electric power section 600 is not applied to the lamp 530.

[0138] When the switch knob 810 is pushed backward as shown by the solid line in FIG. 31, the front end of the moving node 820 is in contact with the lateral node 533 of the lamp 530, and the rear end of the moving node 820 is in contact with the fixed node 800, so that electric power from the electric power section 600 is applied to the lamp 530 through the electric power connection means to light the lamp 530.

[0139] The light emitted from the lamp 530 is oriented forward coinciding with the user's line of vision at the center of the user's visual field. Even when the user turns his line of vision up and down, and left and right, the light can be shed exactly on the object, which the user sees.

[0140] In cap according to the second embodiment of the invention, the socket housing 520 is pivotally assembled with the lantern cover 510 by means of the hinge groove 529 and the hinge protuberance 513. However, since the switch knob exposing hole 14 is formed at the visor 12 of the cap 10 to expose the switch knob 810 and the switch knob exposing hole 14 has a transverse section smaller than that of the socket housing 520, the socket housing 520 is always maintained in parallel with the visor 12.

[0141] FIGs. 34 and 35 show a cap according to a third embodiment of the present invention, in which the visor 12 of the cap 10 has a socket housing operation hole 16 having a transverse section larger than that of the socket housing 520, so that the socket housing 520 can be pivoted about the hinge protuberance 513 and the hinge groove 529 to make the light emitted from the lamp 530 be oriented downward. Therefore, even when the wearer's line of vision is oriented downward, for example, when the wearer is putting a bait on a hook or separating the hook from a caught fish, in the course of fishing in the night, the labor can be performed easily. Other constructions and operations in the present embodiment are the same as those in the second embodiment as described above, the description of which will be therefore omitted, and the same elements will be numbered the same in the drawings.

[0142] Although FIG. 35 shows a state, in which the socket housing 520 is pivoted downward by ninety degrees, the socket housing 520 can be pivoted by any predetermined degrees between the lay state and the upright state.

[0143] FIG. 36 shows a modified example of the electric power section, in which one battery B is

received in the battery receiving space 611 of the battery casing 610. Other constructions of this electric power section are the same as those in the second embodiment, the description of which will be therefore omitted, and the same elements will be numbered the same in the drawings. In FIG. 36, reference numeral 631 designates a connection slit for connecting the spring nodes 630 of one electric power side with one strand of the power source-side electric wire 700.

[0144] FIG. 37 shows another exemplary arrangement of the electric power section 600 employed in a cap having 17, in which the electric power section 600 is disposed between the cap body 11 and 17, and the inner cloth 17 has 17a, so that the battery B can be easily replaced from the electric power section 600. Other constructions in the present embodiment are the same as those in the second embodiment as described above, the description of which will be therefore omitted, and the same elements will be numbered the same in the drawings. Further, the lighting section is not shown in FIG. 37, since it is the same as that in other embodiments.

[0145] FIG. 38 shows another exemplary arrangement of the electric power sections 600, in which an electric power section 600 is received in the pocket 18 formed at one side of the cap body 11, and a pocket cover 18a attached to the pocket 18 is covered over the electric power section 600, so as to prevent the electric power section 600 from being separated therefrom. The pocket cover 18a is maintained to cover the pocket 18 by means of a Velcro fastener 19. The lighting section is not shown also in FIG. 37.

[0146] FIGs. 39 to 42 show other exemplary arrangements of the electric power sections 600. In FIG. 39, an electric power section 600 is disposed at the top of the cap body 11 as that in the second embodiment, and two electric power sections 600 are received in the pocket 18 and covered by the pocket cover 18a, which are respectively formed at both sides of the cap body 11, these three electric power sections 600 being connected in parallel with each other by means of electric power connection means. In FIG. 40, an electric power section 600 is disposed at the top of the cap body 11, and three electric power sections 600 are received in the pocket 18 and covered by the pocket cover 18a, which are respectively formed at both lateral sides and a rear side of the cap body 11, these four electric power sections 600 being connected in parallel with each other by means of electric power connection means. In FIG. 41, two electric power sections 600 are received in the pocket 18 and covered by the pocket cover 18a, which are respectively formed at both sides of the cap body 11, and these two electric power sections 600 are connected in parallel with each other by means of electric power connection means. In FIG. 42, three electric power sections 600 are received in the pocket 18 and covered by the pocket cover 18a, which are respectively formed at both lateral sides and a rear side of the cap

body 11, and these three electric power sections 800 are connected in parallel with each other by means of electric power connection means.

[0147] FIGs. 43 to 54 show various exemplary arrangements of the lighting sections 500 and the electric power sections 800. In FIGs. 43 to 54, the lighting sections A employ a fixed type as that in the second embodiment, in which the socket housing 520 is fixed in parallel to 12, and the lighting sections B employ a movable type as that in the third embodiment, in which the socket housing 520 can be located in parallel to the visor 12 and can be pivoted at a predetermined angle with respect to the visor 12.

[0148] Further, in FIGs. 43 to 54, the electric power sections 800 located at the center of the cap body 11 are disposed in the same way as in the second embodiment, and the electric power sections 800 located at both lateral sides and the rear side of the cap body 11 are received in the pocket 18 and covered by the pocket cover 18a as in FIG. 38.

[0149] Also, in FIGs. 43 to 54, the lines interconnecting the lighting sections A and B with the electric power sections 800 are the power source-side electric wire 700. The arrangements of the lighting sections 500 and the electric power sections 800 may be variously changed according to the necessity.

[0150] FIGs. 55 to 62 show a cap having a lantern according to another embodiment of the present invention, in which FIG. 55 is a side view, FIG. 56 is a front view, FIG. 57 is a plan view, FIG. 58 is an enlarged view of the circled part B in FIG. 55, FIG. 59 is an exploded sectional view of a lantern and a socket, FIG. 60 is a sectional view taken along line K-K in FIG. 58, FIG. 61 is a sectional view taken along line L-L in FIG. 58, and FIG. 62 is a sectional view taken along line M-M in FIG. 58.

[0151] In the cap according to the present embodiment as shown, a cap body 11' is made by laminating a plurality of textile sheets 11a' and forming them to have a shape of a hemisphere. However, the present invention is not restricted by the present embodiment, but can employ any shape comprising a cap body and a visor. In the drawings, reference numeral 11b' designates a seam line of the cap body 11'.

[0152] As shown, the cap having a lantern according to the present embodiment includes a lighting section 100' disposed on a center of a front portion of the cap body 11', an electric power section 200' disposed at a central portion of the cap body 11', electric power connection means for electrically interconnecting the lighting section 100' and the electric power section 200' to each other, and switching means for switching on and off the electric power applied to the lighting section 100'.

[0153] The lighting section 100' includes a lantern cover 110' fixed to the center of the front portion of the cap body 11', a socket housing 120' contained in the lantern cover 110', a lamp 130' fitted in the socket housing 120', a reflection mirror 140' disposed surrounding

the lamp 130', and a transparent protection lid 150' disposed in front of the reflection mirror 140'.

[0154] The lantern cover 110' has a section having a shape similar to the letter U whose rear surface is open, and covers over a through hole 13' (see FIG. 58) formed at the center of the front surface of the cap body 11'.

[0155] The lantern cover 110' may be made from metal, or may be preferably made by injection-molding synthetic resin. In order to assemble the lantern cover 110' with the cap body 11', four bosses 111' (see FIGs. 59 and 60) are formed at opening surfaces of an inner lower portion of the lantern cover 110', and a fixing screw 112' extending from the inside to the front side through the cap body 11' are assembled with the bosses 111'. However, the present invention is not restricted by this assembly, but can employ other assembling means utilizing rivets, adhesive, ultrasonic wave, radio frequency wave, etc. Further, a plurality of protuberances may be formed on the lower surface of the main wall of the lantern cover 110', and be inserted frontward from the inside through the cap body 11', and then the lower ends of the protuberances are melted to be expanded, so that the lantern cover 110' is fixed. Besides, in the case where the cap body 11' is made from synthetic resin, the lantern cover 110' may be integrally formed with the cap body 11' while the cap body 11' is formed.

[0156] Hinge protuberances 113' are formed at inner surfaces of both side walls of the lantern cover 110', so as to pivotally support the socket housing 120'.

[0157] A wire fixing recess 114' for fixing an electric wire 310' of the electric power connection means is formed at an inside of an upper end of the lantern cover 110', and a stopper 116' is fitted in a lower end of the wire fixing recess 114'.

[0158] A retainer holding rib 115' is formed at the wire fixing recess 114' so as to fix the stopper 116', and a supporting bracket 117' for holding a wire connector 340' of the electric power connection means is formed at the stopper 116'.

[0159] At a front portion of the lantern cover 110' is formed a socket housing fitting hole 118' through which the socket housing 120' extends forward. The socket housing fitting hole 118' has such a size as to maintain the socket housing 120' at a position in which a front portion of the socket housing 120' protrudes forward from the socket housing fitting hole 118'.

[0160] The socket housing 120' has a shape of a cylinder whose front and rear ends are open. The socket housing 120' has a socket portion 121' protruding forward through the socket housing fitting hole 118', a male screw portion 122' formed at an outer surface of the front end thereof, a hook hole 123' formed at a rear end of a main wall of the rear end thereof, and a switch knob guiding hole 124' formed at a side of the main wall corresponding to the socket portion 121'. The rear end portion of the lamp 130' is received in the socket



portion 121', and the switch knob 410' of the switching means is slidably inserted in the switch knob guiding hole 124'.

[0161] The PCB mounting groove 125' for assembling a PCB 320' is formed at a rear end portion of the socket housing 120'.

[0162] A rear end lid 126' is assembled with a rear end portion of the socket housing 120' and has an elastic hook 127' engaged with the hook hole 123'. At the rear end lid 126' is formed a wire passing hole 126a' through which a socket-side electric wire 330' extends. A node supporting groove 128' for supporting a fixed node 400' is formed at an outer surface of a lower portion of the socket portion 121'. At both sides of the socket housing 120' are formed a hinge groove 129' in which are fitted the hinge protuberances 113' formed at an inner surface of the lantern cover 110'. The lamp 130' includes a bulb 131' containing a filament, a rear end node 132' electrically interconnected to one end of the filament, a lateral node 133' electrically interconnected to the other end of the filament, and a flange 134' formed at a middle portion of the lateral node 133'.

[0163] The socket portion 121' has a shape of a cylinder whose front and rear ends are open, and has an annular lamp seat 121a' formed at an inner surface of a front end of the socket portion 121', into which the rear end portion of the lamp 130' after the flange 134' can be inserted.

[0164] The reflection mirror 140' has a reflective inner surface in which the bulb 131' of the lamp 130' is inserted. The transparent protection lid 150' has a front light-transmitting portion 151' and a cylindrical portion 152'. The cylindrical portion 152' has a cylindrical shape extending backward from the front light-transmitting portion 151' and having an open rear end. At an inner end of the cylindrical portion 152' of the transparent protection lid 150' is formed a female screw portion 153', which is engaged with the male screw portion 122' formed at the outer surface of the front end of the socket housing 120'. Between the socket housing 120' and the transparent protection lid 150' is inserted an O-ring 154' for preventing entrance of water and foreign material. The electric power section 200' includes, as shown in FIGs. 19 and 20, a battery casing 210' having a battery receiving space 211' both ends of which are open, a pair of stoppers 220' capped on both ends of the battery casing 210', spring nodes 230' being assembled with inner side surfaces of the stoppers 220'. The stoppers 220' has a shape of a cup, which includes an end wall 221' blocking both opening ends of the battery casing 210' and assembling portions 222' extending inward from the end wall 221' to be put on outer surfaces of the opposite ends of the battery casing 210'. Stopper engagement grooves 212' are formed at the outer surfaces of the opposite ends of the battery casing 210', and engagement protuberances 223' engaged with the stopper engagement grooves 212' are formed at inner surfaces of the assembling portions 222' of the stoppers

220'. At the outer surfaces of the opposite ends of the battery casing 210' are formed an O-ring groove 213', in which are inserted an O-ring 240' for preventing water and foreign material from coming into the interior through the gap between the outer surfaces of the stoppers 220' and the inner surfaces of the assembling portions 222'. Spring holding protuberances 224' for fixing the spring nodes 230' are formed at the inner surfaces of the end wall 221' of the stoppers 220', and wire guiding holes 225', through which a power source-side electric wire 300' fixed by soldering to the spring nodes 230' extends, are formed at the end wall 221'. When the battery casing 210' is assembled with the cap body 11', a screw boss 214' is formed at a central portion of the outer surface of the battery casing 210' and is tightly attached on the inner surface of the cap body 11'. Then, a washer 215' having a screw hole 216' corresponding to the screw boss 214' is tightly attached on the outer surface of the cap body 11'. In this state, a fixing screw 217' is inserted through the screw hole 216' and screwed into the screw boss 214', so that the battery casing 210' is assembled with the cap body 11'. An annular protrusion 218' is formed around the screw boss 214', so as to enlarge the area to be in contact with the cap body 11'. An ornamental lid 219' is put on the washer 215', so that the fixing screw 217' is not exposed to the exterior.

[0165] Further, a hook groove 215a' is formed at an outer surface of the washer 215', and a hook 219a' is formed at an inner surface of the ornamental lid 219'. When the ornamental lid 219' is covered on the washer 215', the hook 219a' is fitted in the hook groove 215a' so as to prevent the ornamental lid 219' from being separated from the washer 215'.

[0166] In a cap having a lantern according to the present invention as described above, once the lantern is lighted, the lighting direction of the lantern always coincides with the user's line of vision even when he turns his line of vision toward any direction, so that he can perform his labor very easily and conveniently in a dark environment, for example, when he works in the night, or when he does a fishing in the night.

[0167] Further, in a cap according to the present invention, since the lighting section is disposed at the center of the upper surface of the visor, the worker's visual field is not blocked, which provides further increased convenience for the worker.

[0168] Moreover, since the lighting direction can be adjusted between the lay state and the upright state in the cap of the invention, it is possible to shed the light exactly on any spot at which the user looks.

[0169] While there have been illustrated and described what are considered to be preferred specific embodiments of the present invention, it will be understood by those skilled in the art that the present invention is not limited to the specific embodiments thereof, and various changes and modifications and equivalents may be substituted for elements thereof without depart-



ing from the true scope of the present invention.

#### Claims

1. A cap having a lantern, the cap having a cap body (11) and a visor (12), the cap comprising:
  - at least a lighting section (100) disposed at a center portion of an upper surface of the visor;
  - at least an electric power section (200) disposed at the cap body;
  - electric power connection means (310) for interconnecting the lighting section and the electric power section with each other; and
  - switching means (17, 18, 410, 420, 800, 810) for switching on and off electric power applied to the lighting section.
2. A cap as claimed in claim 1, wherein the lighting section comprises a lantern cover (110, 510) fixed to the upper surface of the visor, a socket housing (120, 520) contained in the lantern cover, a socket (130, 521) fixedly disposed in the socket housing, a lamp (140) fitted in the socket, a reflection mirror (150) disposed surrounding the lamp, a transparent protection window (160) disposed in front of the reflection mirror, and a front end cover (170) for assembling the reflection mirror and the transparent protection window with the socket housing.
3. A cap as claimed in claim 2, wherein the visor has a socket housing operation hole (13, 16), through which the socket housing can pass, and the lantern cover has a section having a shape of a letter U whose lower and front faces are open, the socket housing being pivotally assembled with the lantern cover, so that a front end of the socket housing can be oriented toward the socket housing operation hole.
4. A cap as claimed in claim 1, wherein the electric power section comprises a battery casing (210) fixed to the cap body so as to receive a battery and a first lid (220) for opening and closing the battery casing.
5. A cap as claimed in claim 1 or claim 2, wherein the electric power connection means comprises an electric wire for interconnecting the electric power of the electric power section to the socket of the lighting section, the electric wire being distributed through an interior of a seam line of textile sheets of the cap body and an interior of the visor.
6. A cap as claimed in claim 1 or claim 2, wherein the switching means comprises a moving node (420) disposed between the electric power connection means and the socket to switch the electric power, and a switch knob (410, 810) disposed at the socket housing to be exposed through the socket housing operation hole.
7. A cap as claimed in claim 1, wherein the lighting section comprises a lantern cover (510) fixed to the upper surface of the visor, a socket housing (520) being contained in the lantern cover and having a socket portion (521) formed integrally with a body of the socket housing, a lamp (530) fitted in the socket portion, a reflection mirror (540) disposed surrounding the lamp, and a transparent protection lid (550) disposed in front of the reflection mirror.
8. A cap as claimed in claim 7, wherein the electric power connection means comprises an electric wire for interconnecting the electric power of the electric power section to the lamp of the lighting section, the electric wire being distributed through an interior of a seam line of textile sheets of the cap body and an interior of the visor.
9. A cap as claimed in claim 7, wherein the electric power section comprises a battery casing fixed to the cap body so as to receive a battery, a pair of stoppers capped on both ends of the battery casing, and spring nodes disposed inside of the stoppers to be in contact with terminals of the battery.
10. A cap as claimed in claim 7, wherein the electric power section comprises a battery casing fixed to the cap body so as to receive a battery, a pair of stoppers capped on both ends of the battery casing, and spring nodes disposed inside of the stoppers to be in contact with terminals of the battery, the electric power section being received in a pocket attached to at least one of outer side surfaces and a rear surface of the cap body, the pocket being opened and closed by a second lid.
11. A cap as claimed in claim 7 or claim 8, wherein the switching means comprises a moving node slidably disposed in the socket housing so as to switch an electric power between the electric power connection means and the lamp, and a switch knob slidably disposed at the socket housing to be exposed through a switch knob exposing hole formed at the visor.
12. A cap as claimed in claim 7 or claim 8, wherein the visor has a socket housing operation hole, through which the socket housing can pass, and the lantern cover has a section having a shape of a letter U whose lower and front faces are open, the socket housing being pivotally assembled with the lantern

cover, so that a front end of the socket housing can be oriented toward the socket housing operation hole.

13. A cap as claimed in one of claims 9 to 12, wherein  
at least one of the lighting section of claim 11 and  
the lighting section of claim 12 is disposed at the  
visor, and at least one of the electric power section  
of claim 9 and the electric power section of claim 10  
is disposed at the cap body.

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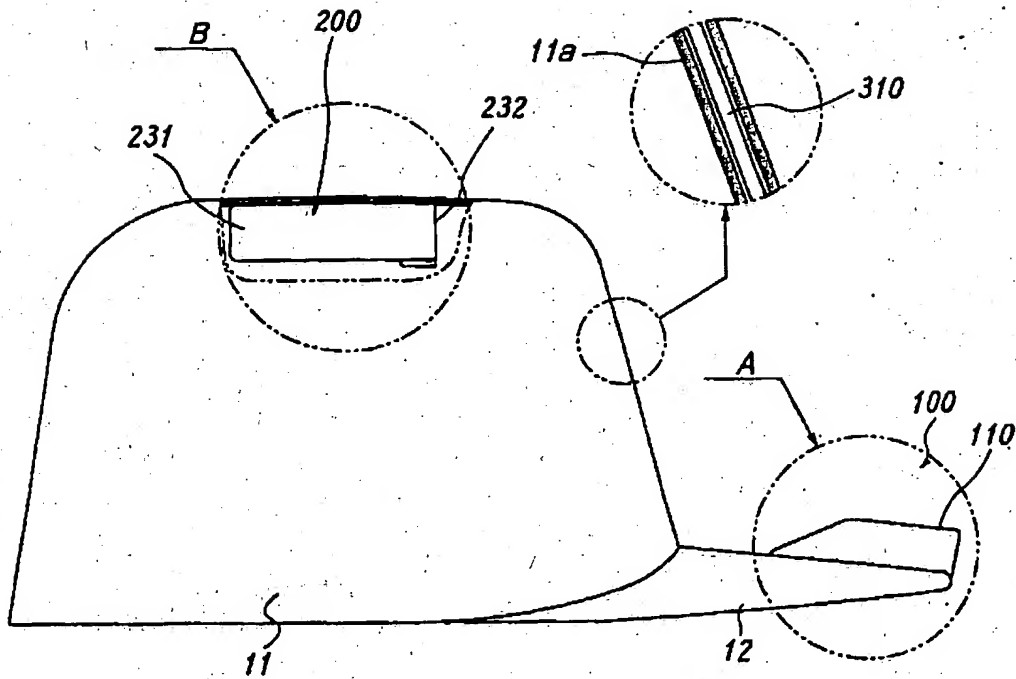
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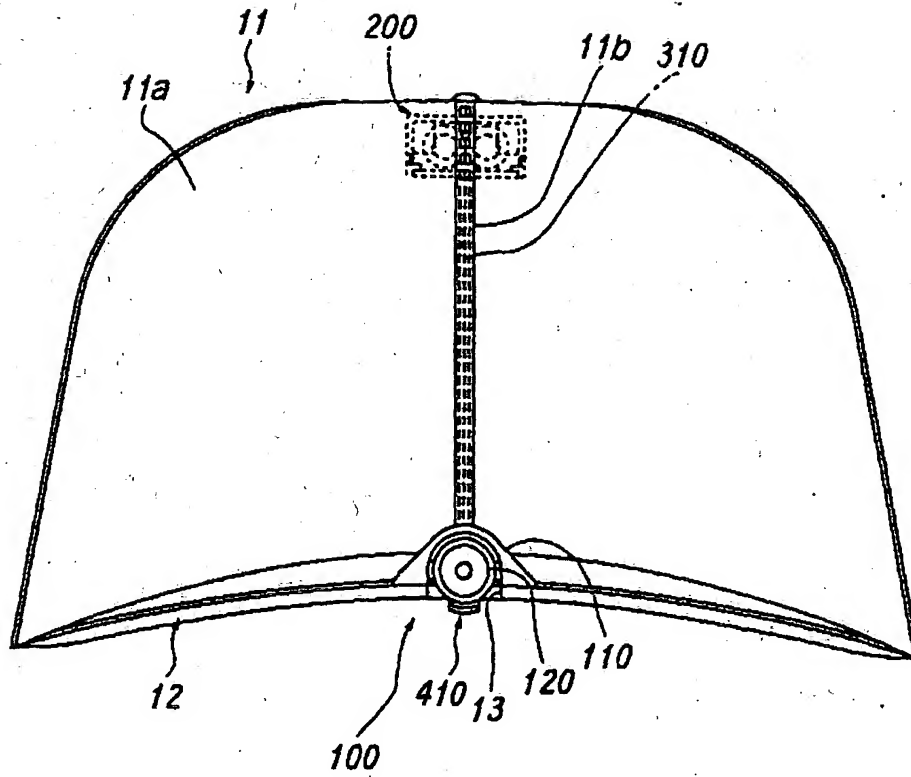
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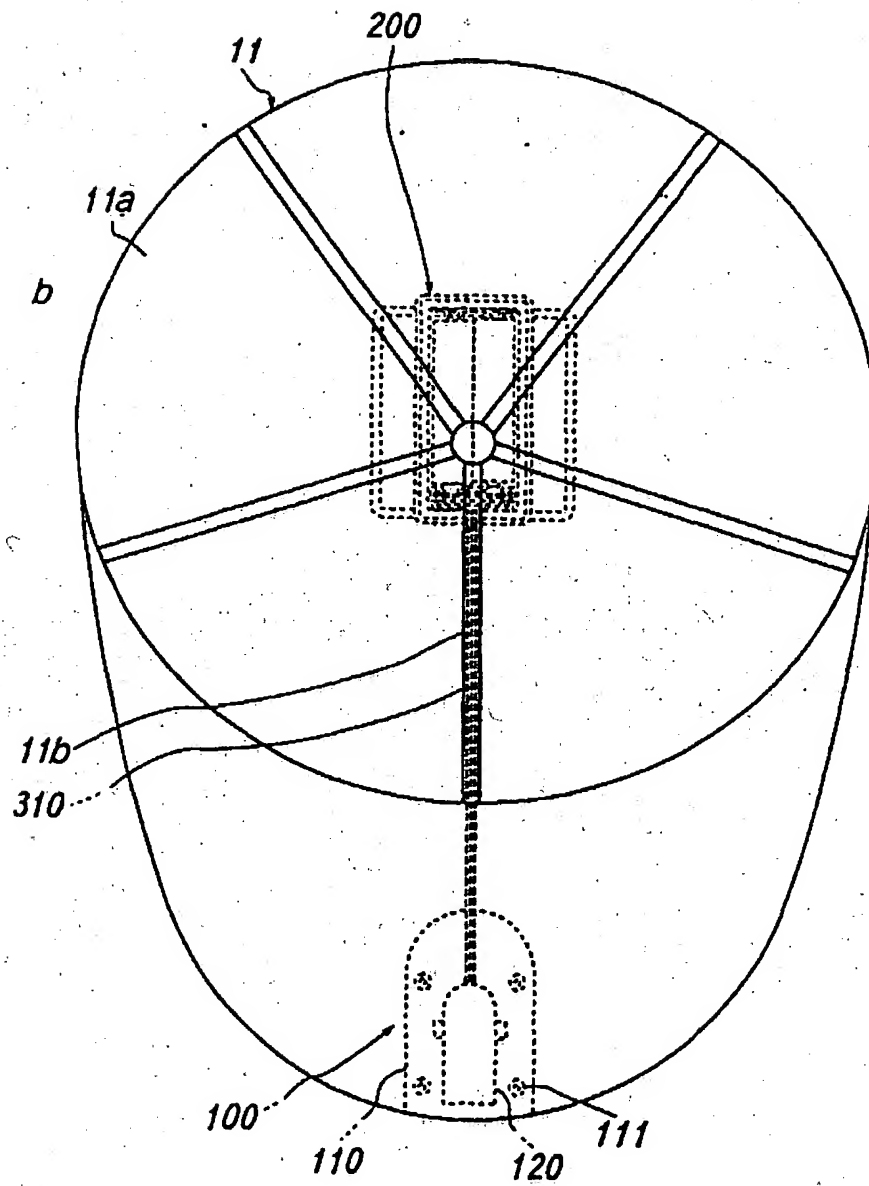
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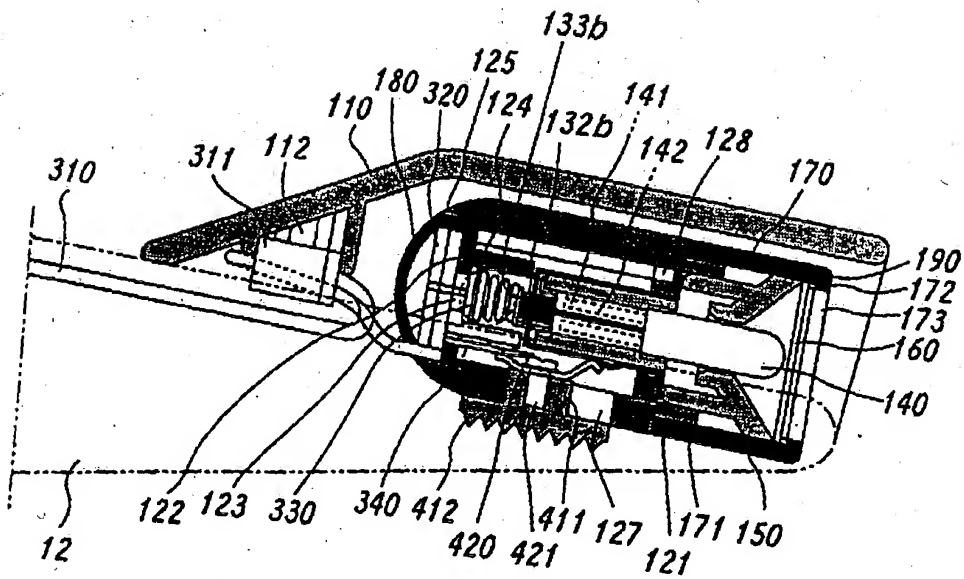
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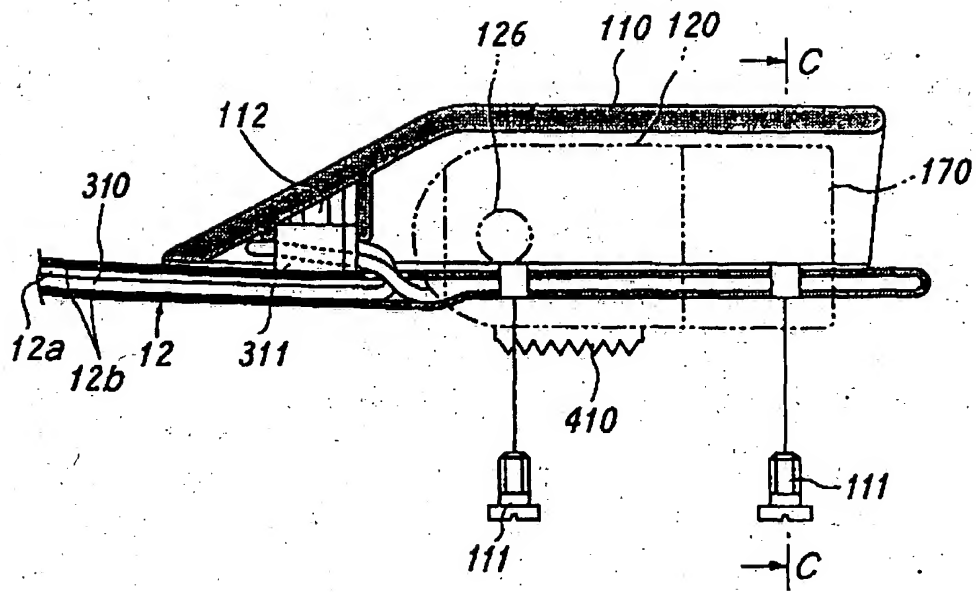


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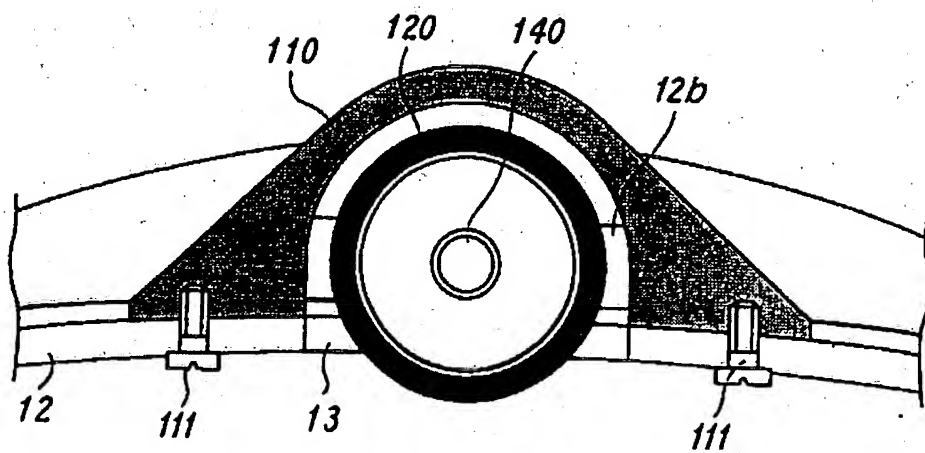




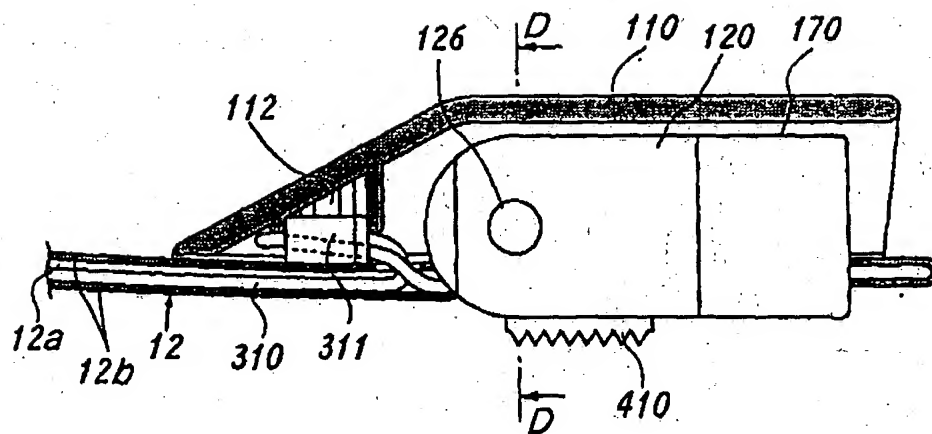
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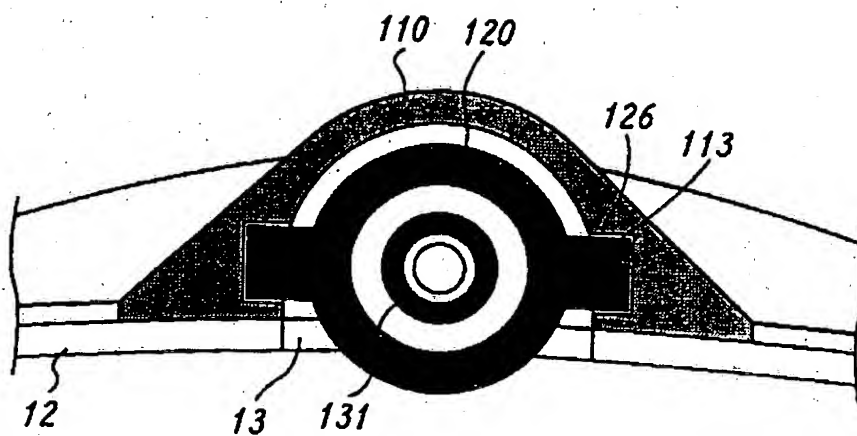
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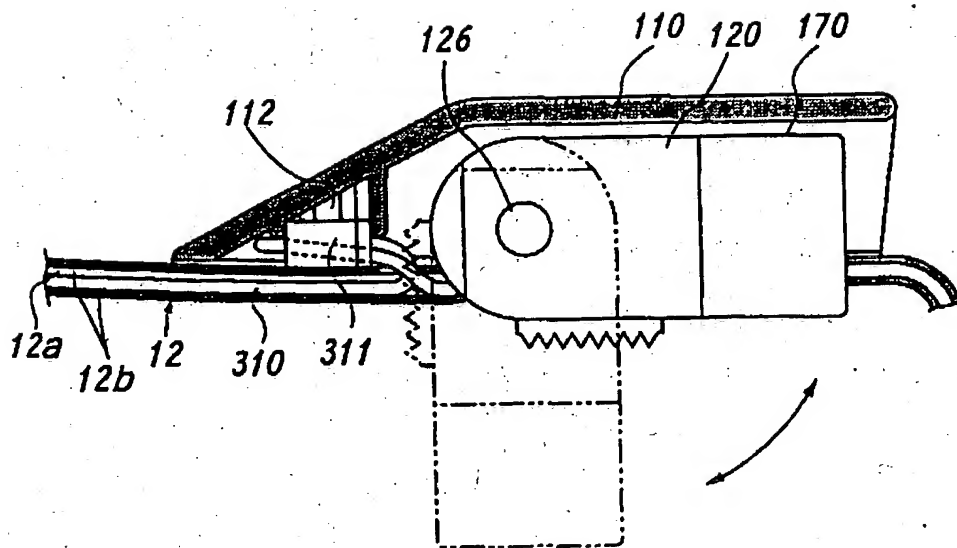
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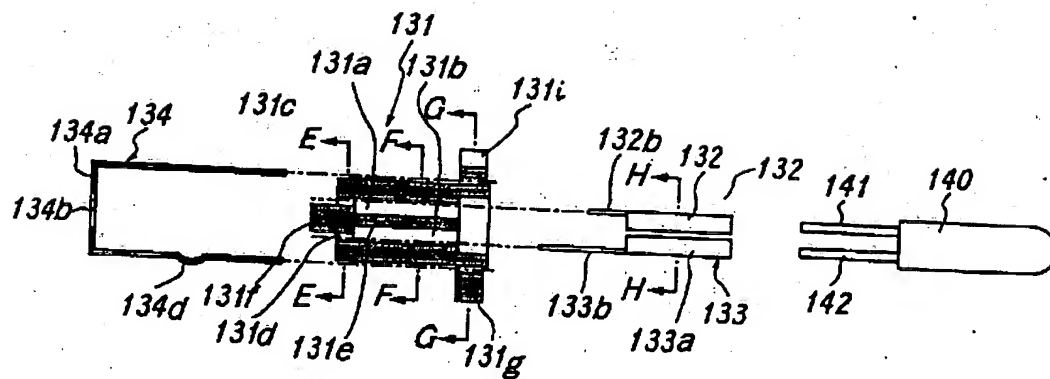
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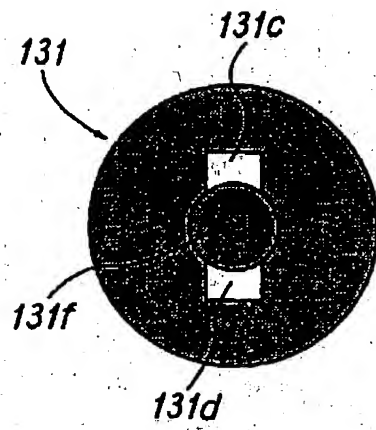


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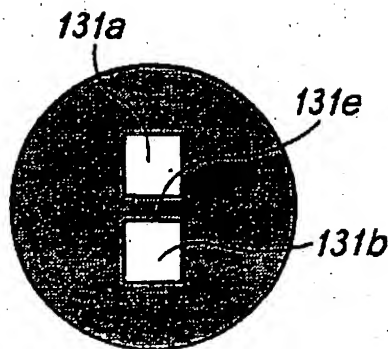




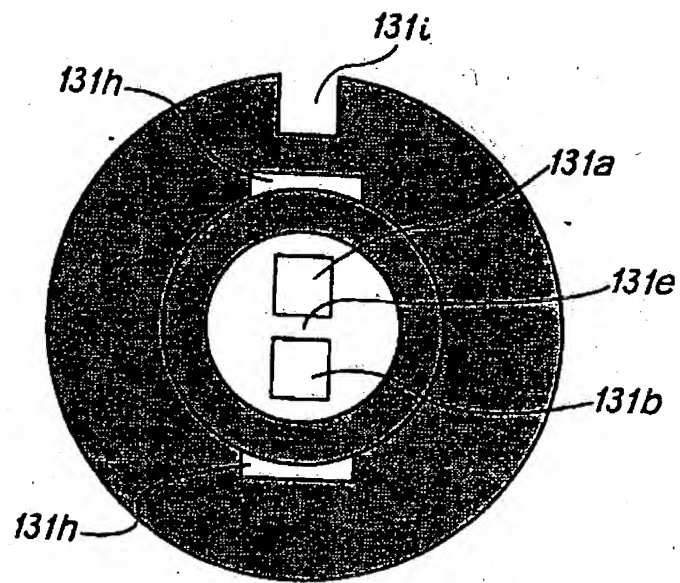
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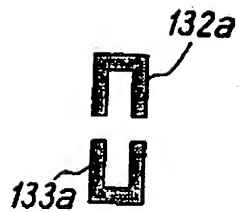
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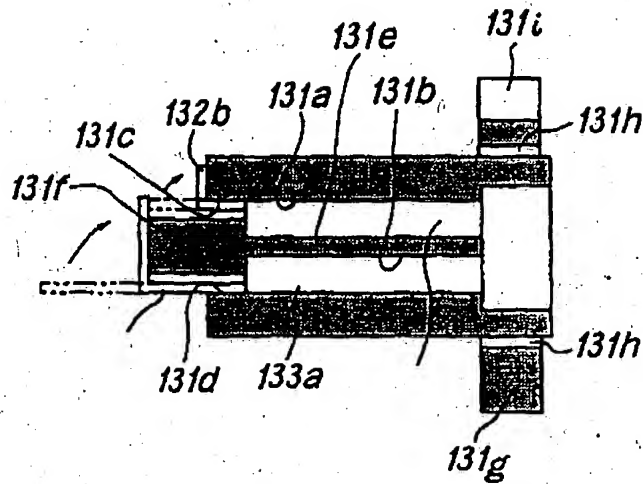
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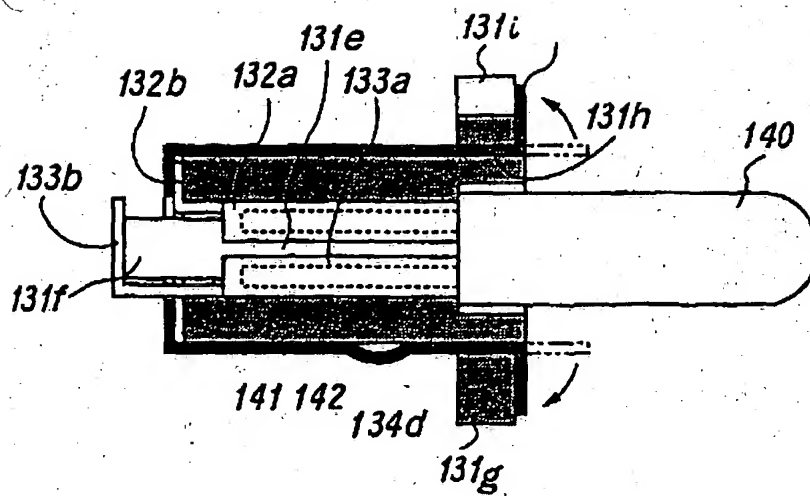
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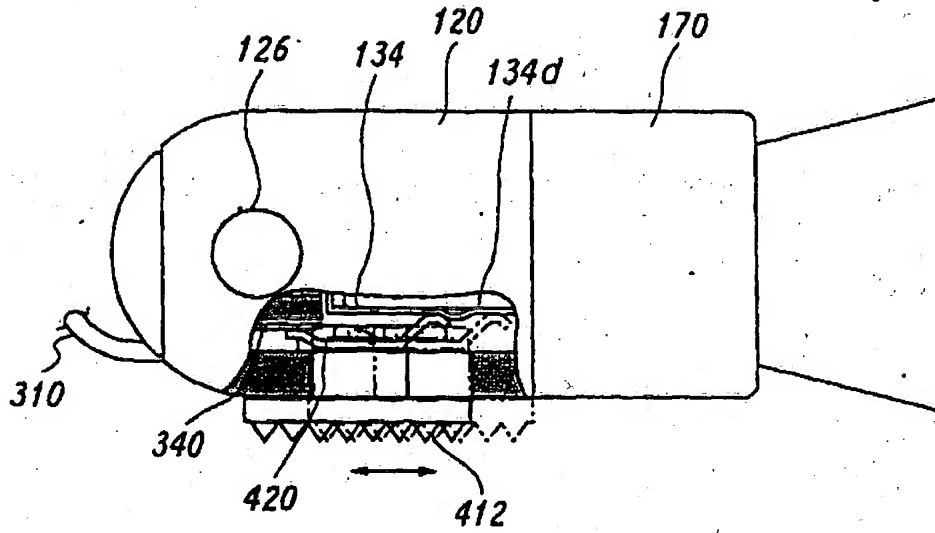
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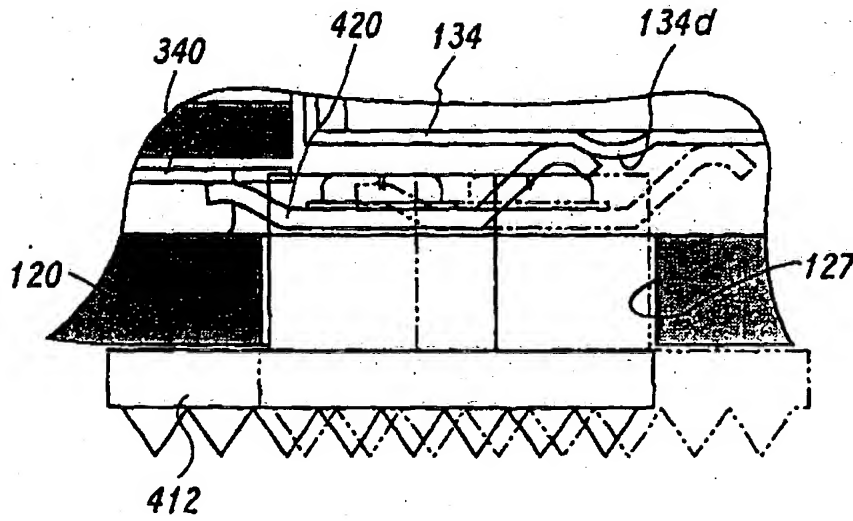
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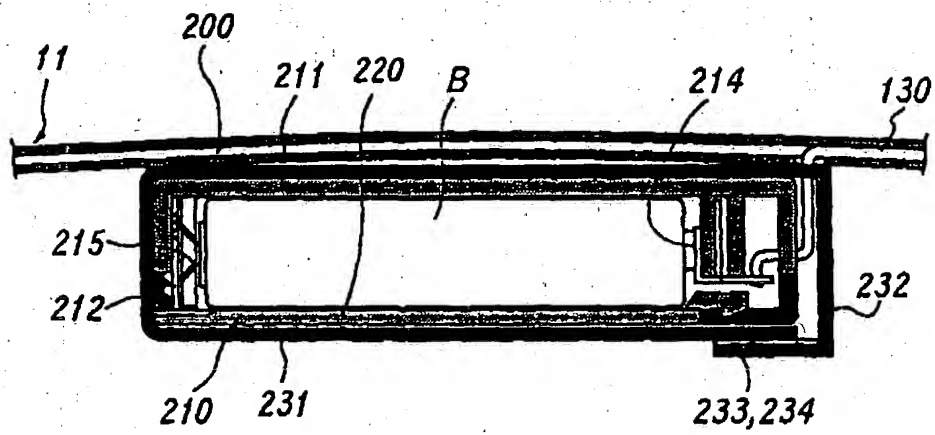
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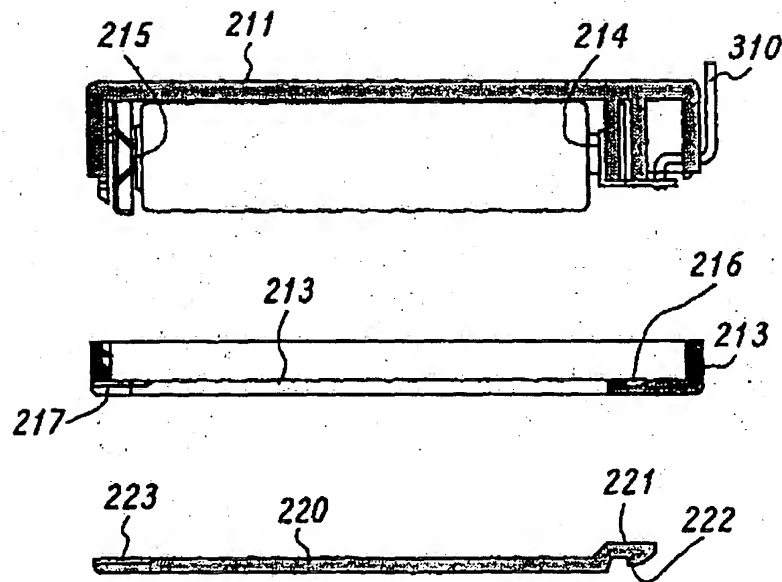
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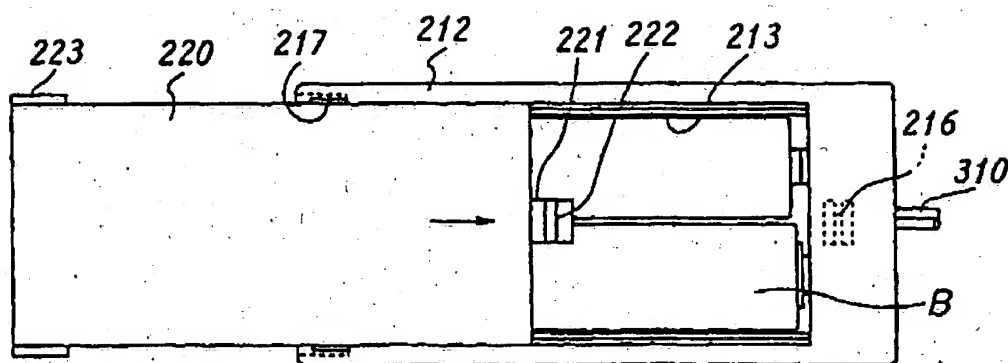


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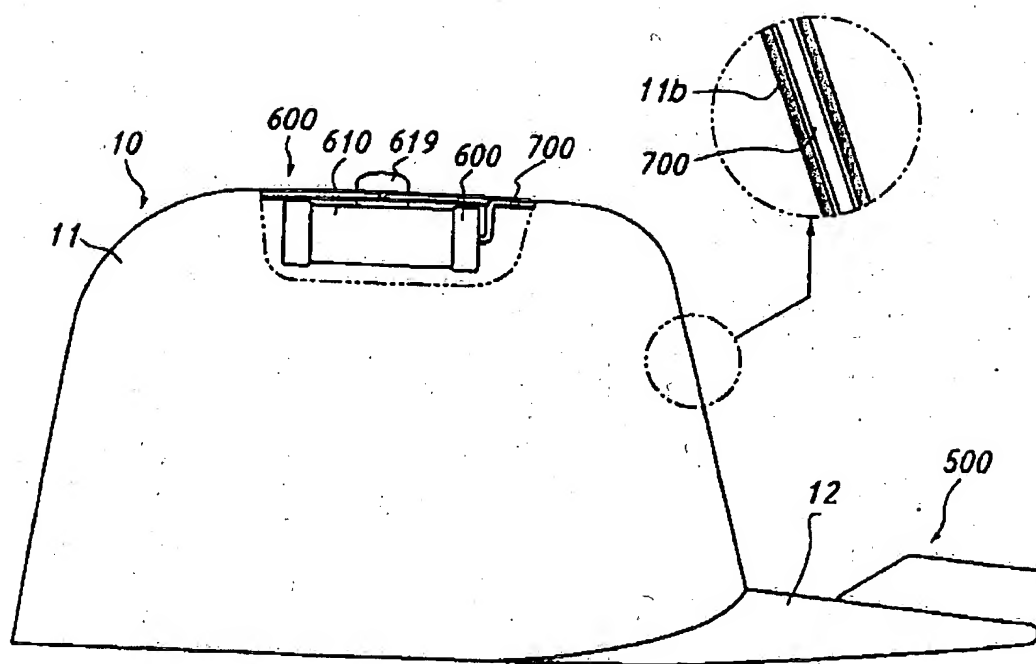




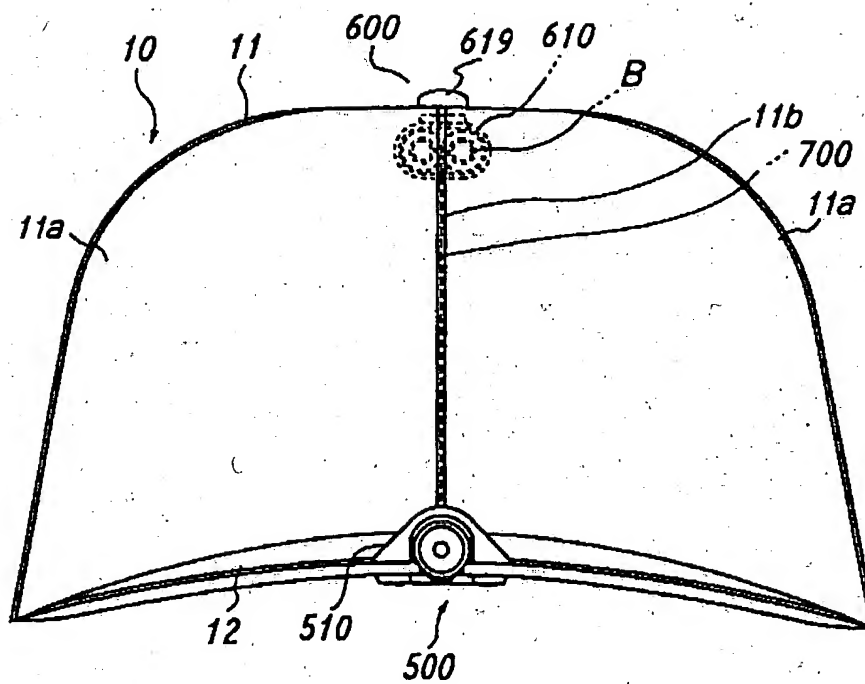
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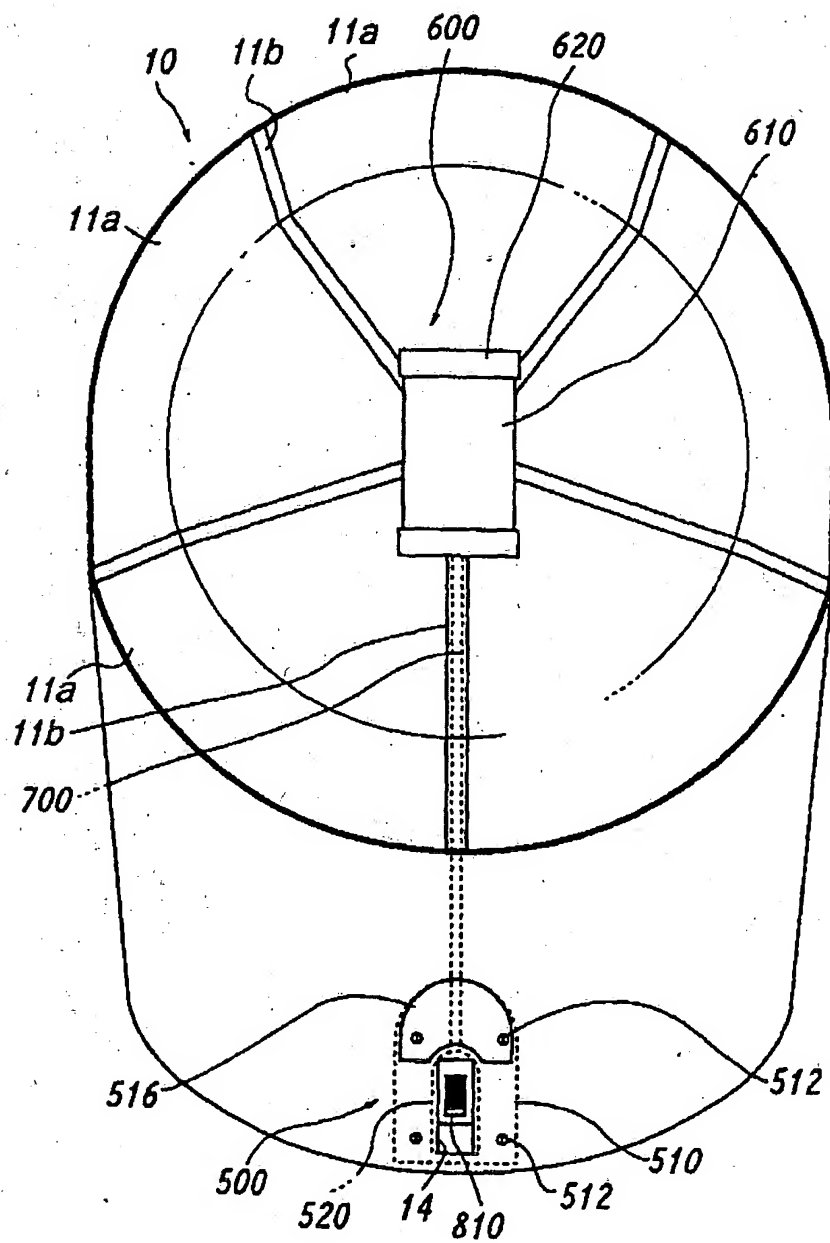
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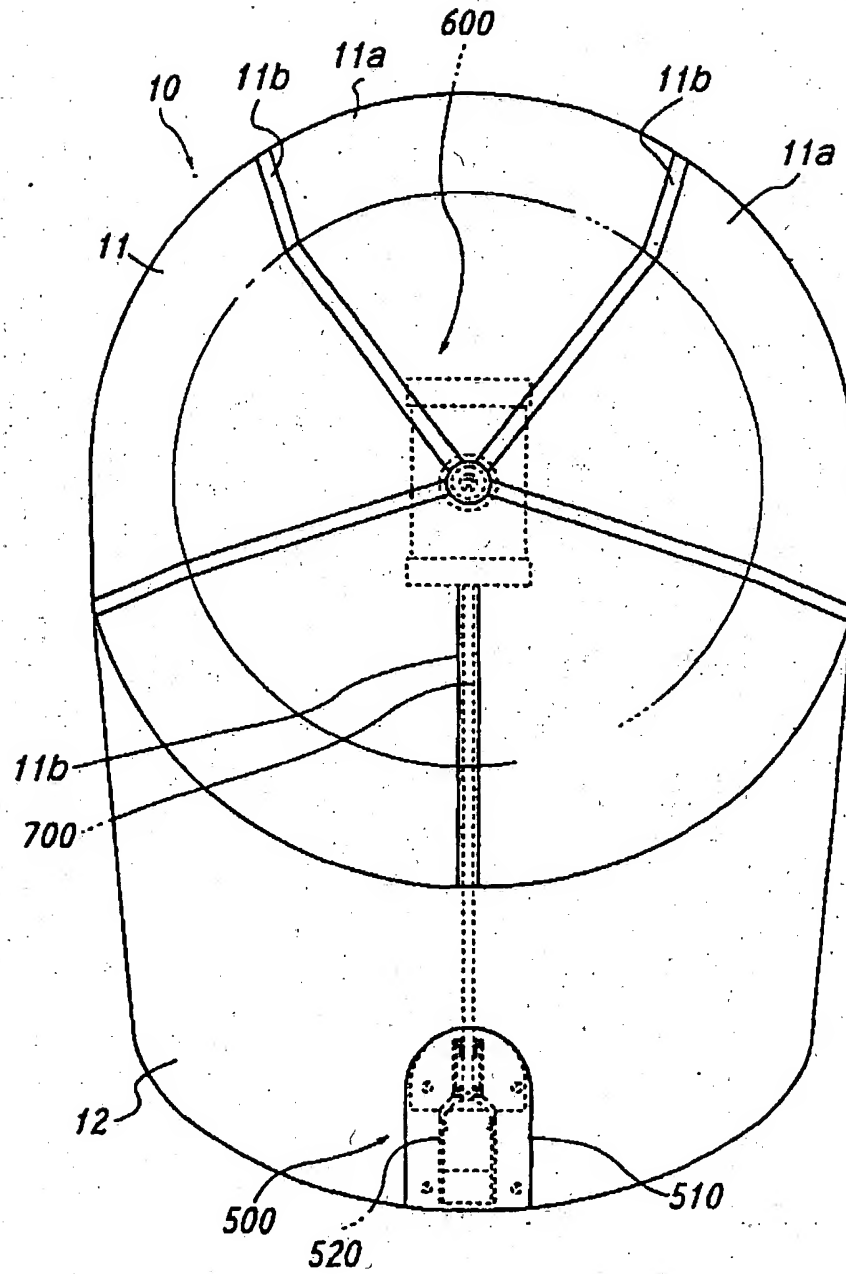
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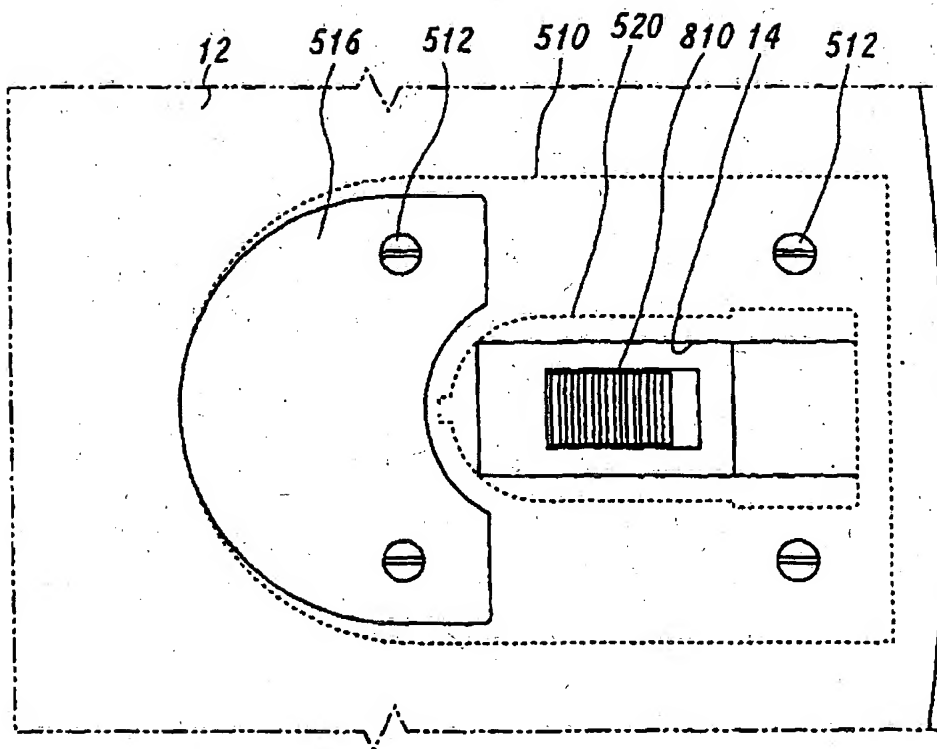
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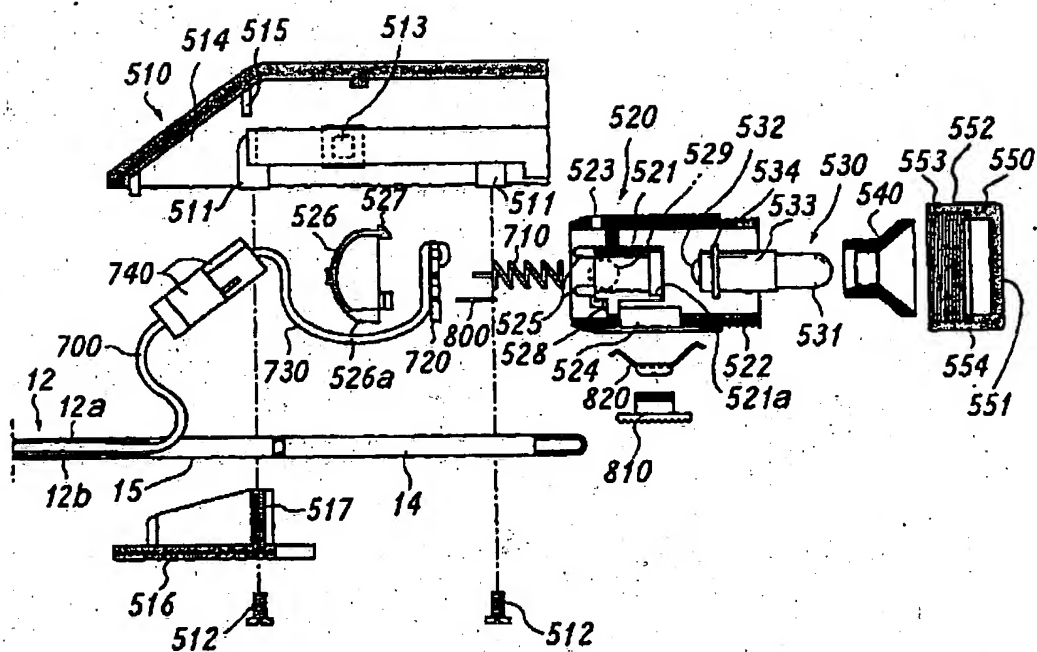
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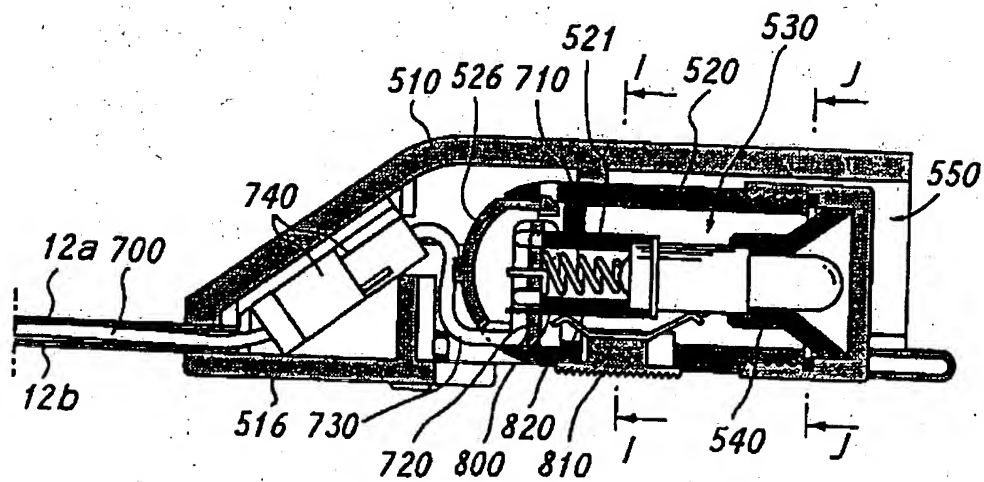
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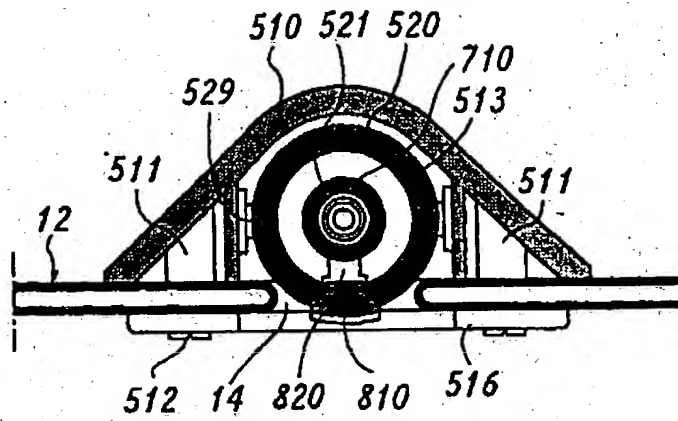


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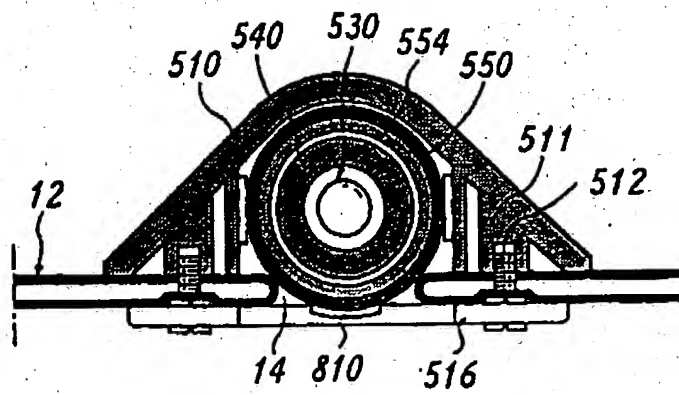




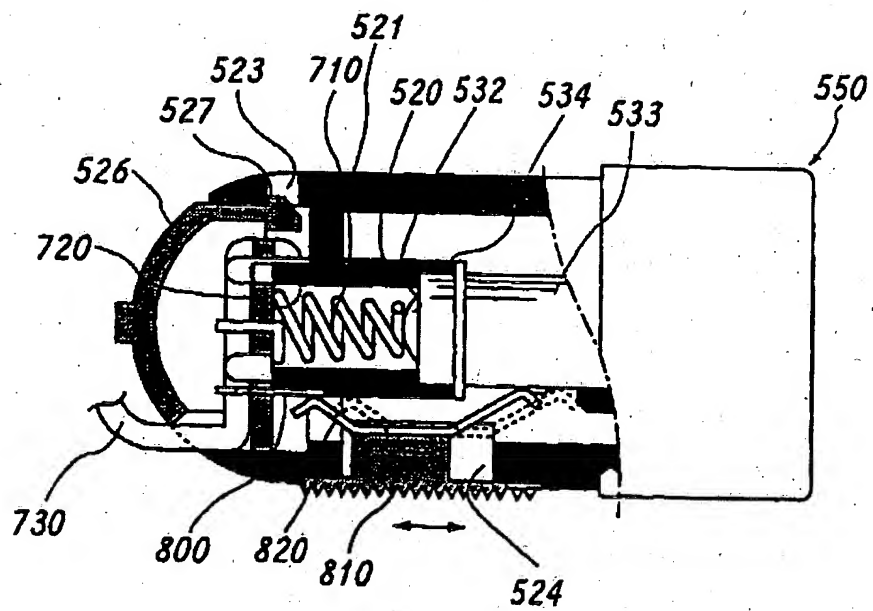
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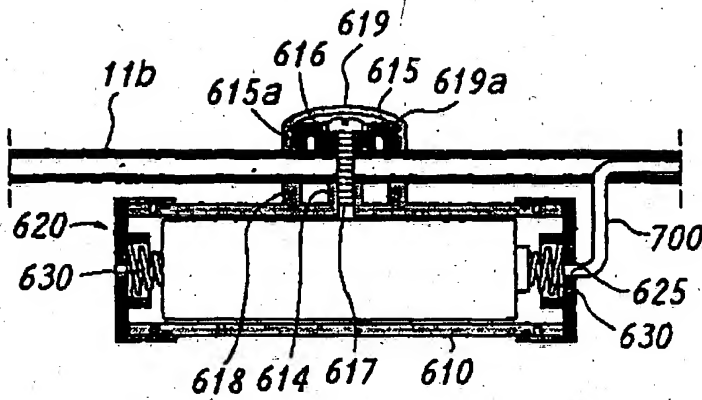
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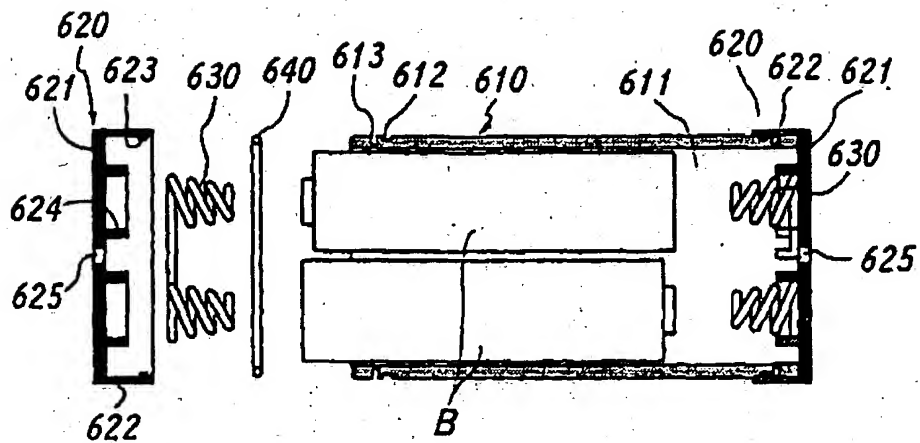
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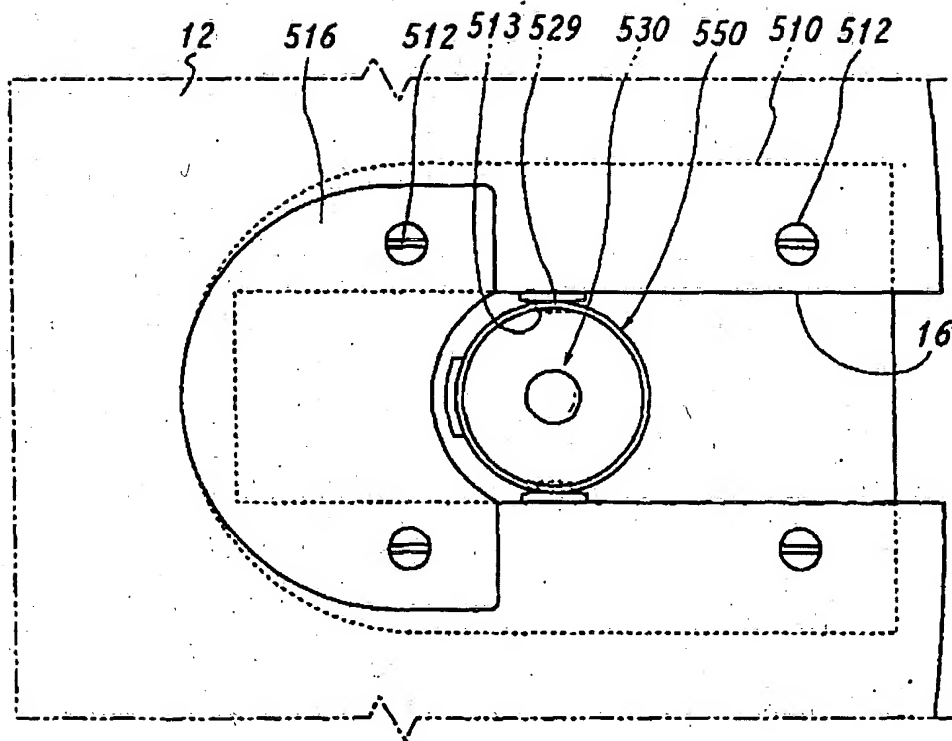
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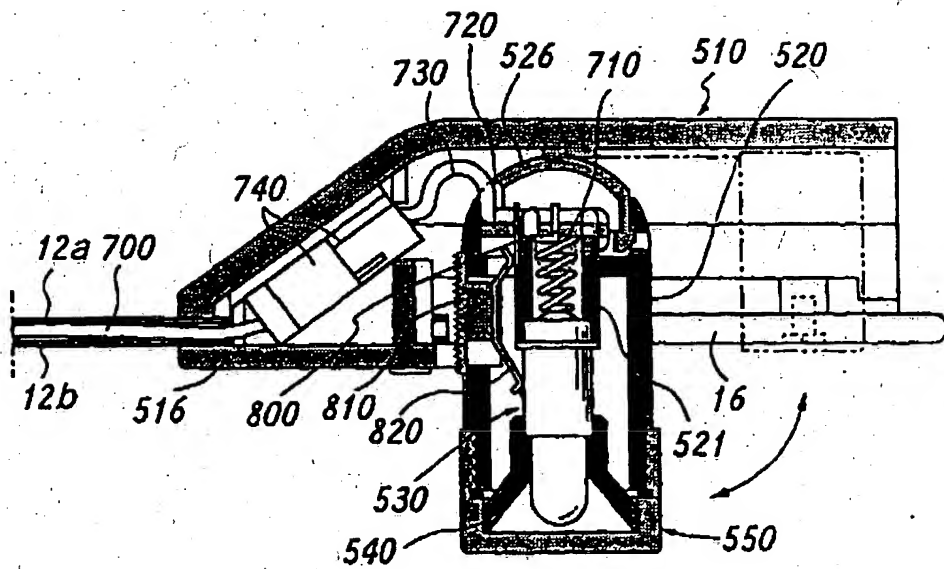
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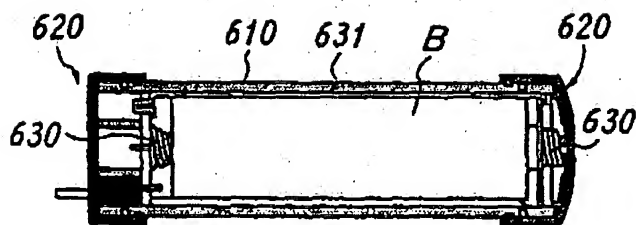
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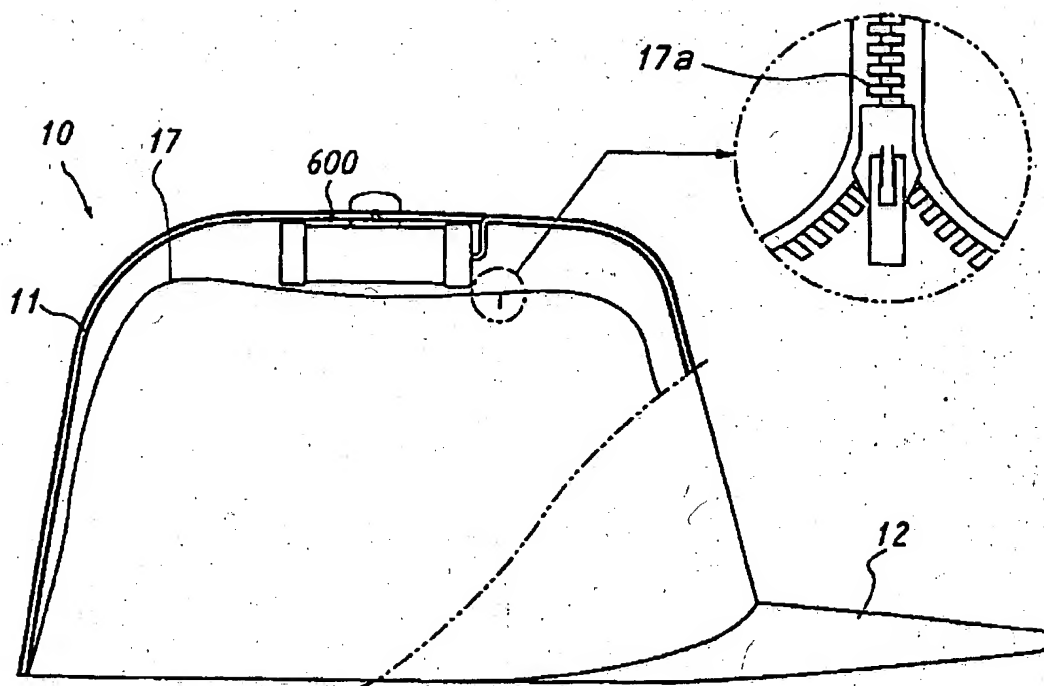
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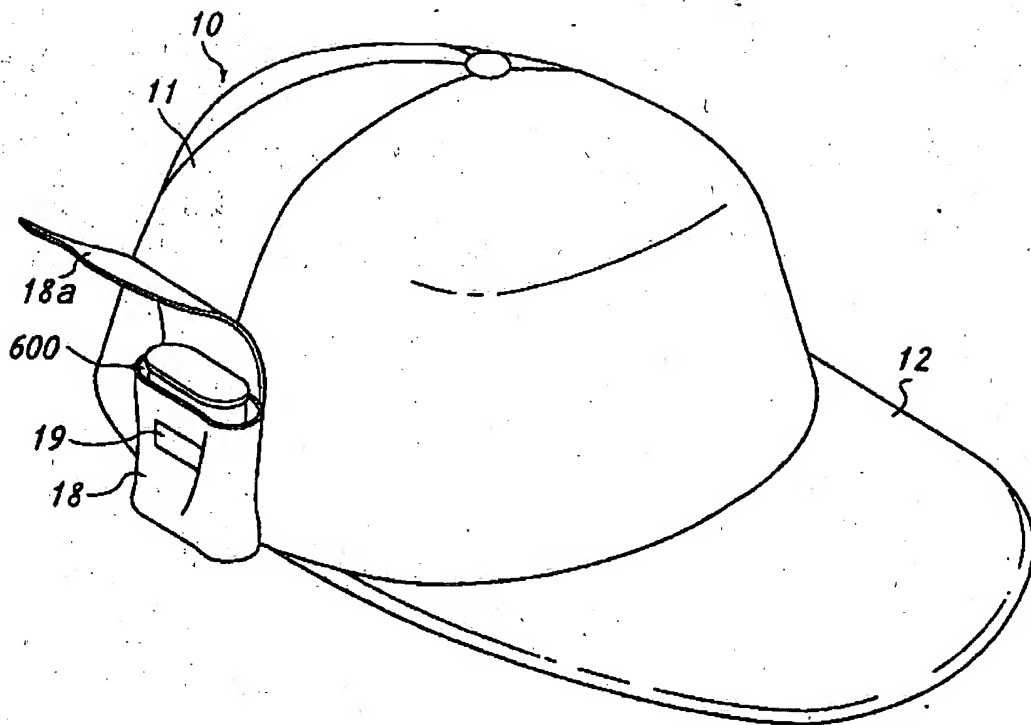
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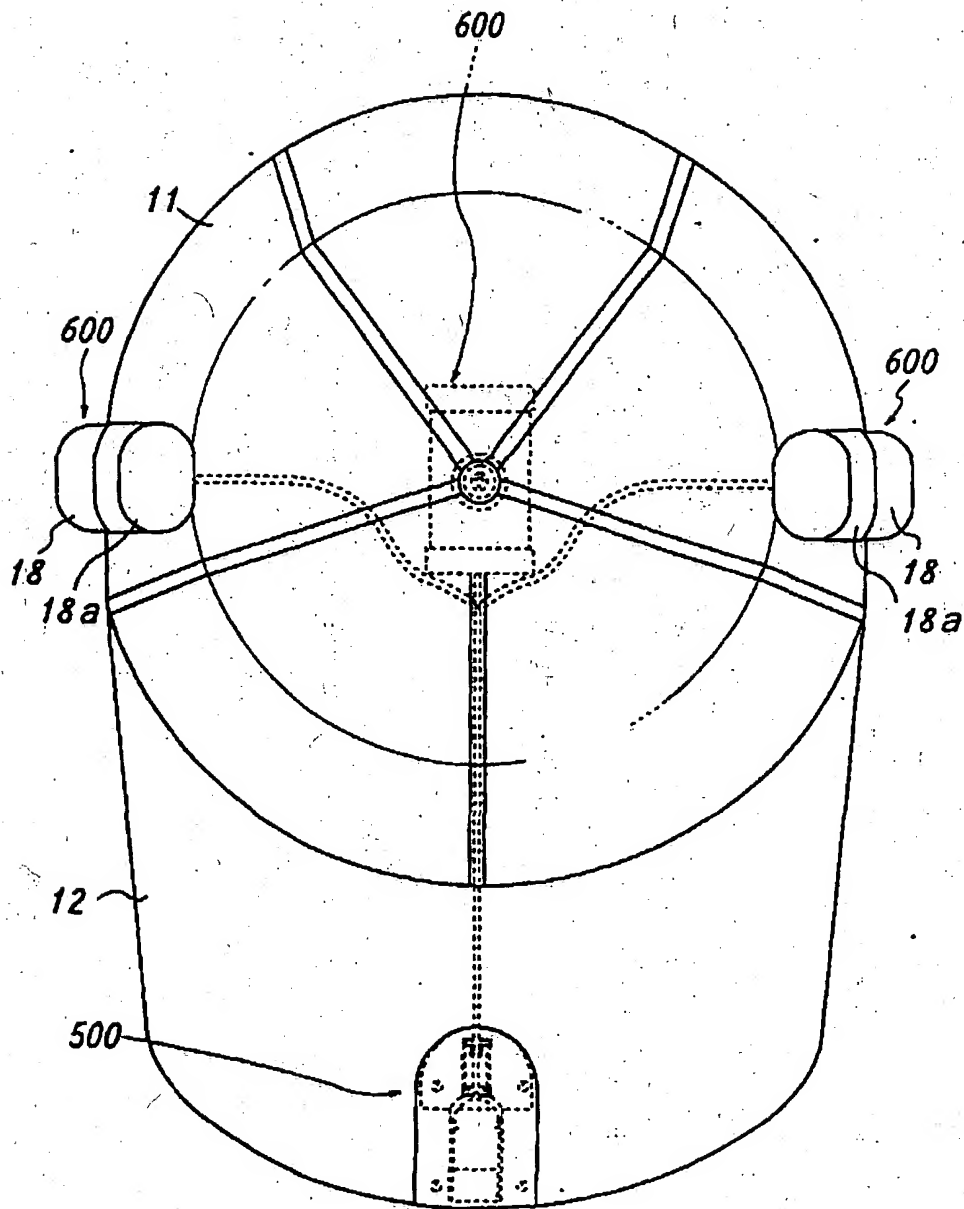


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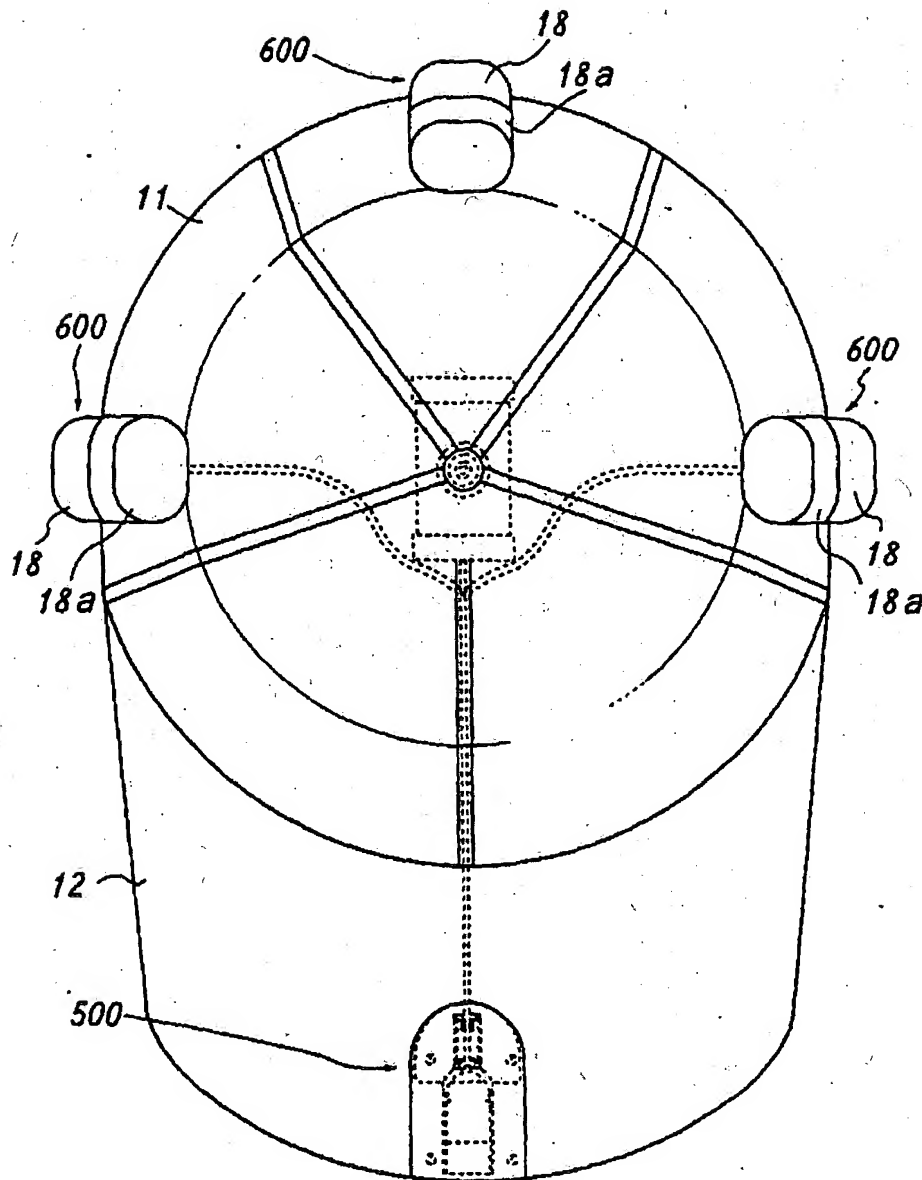




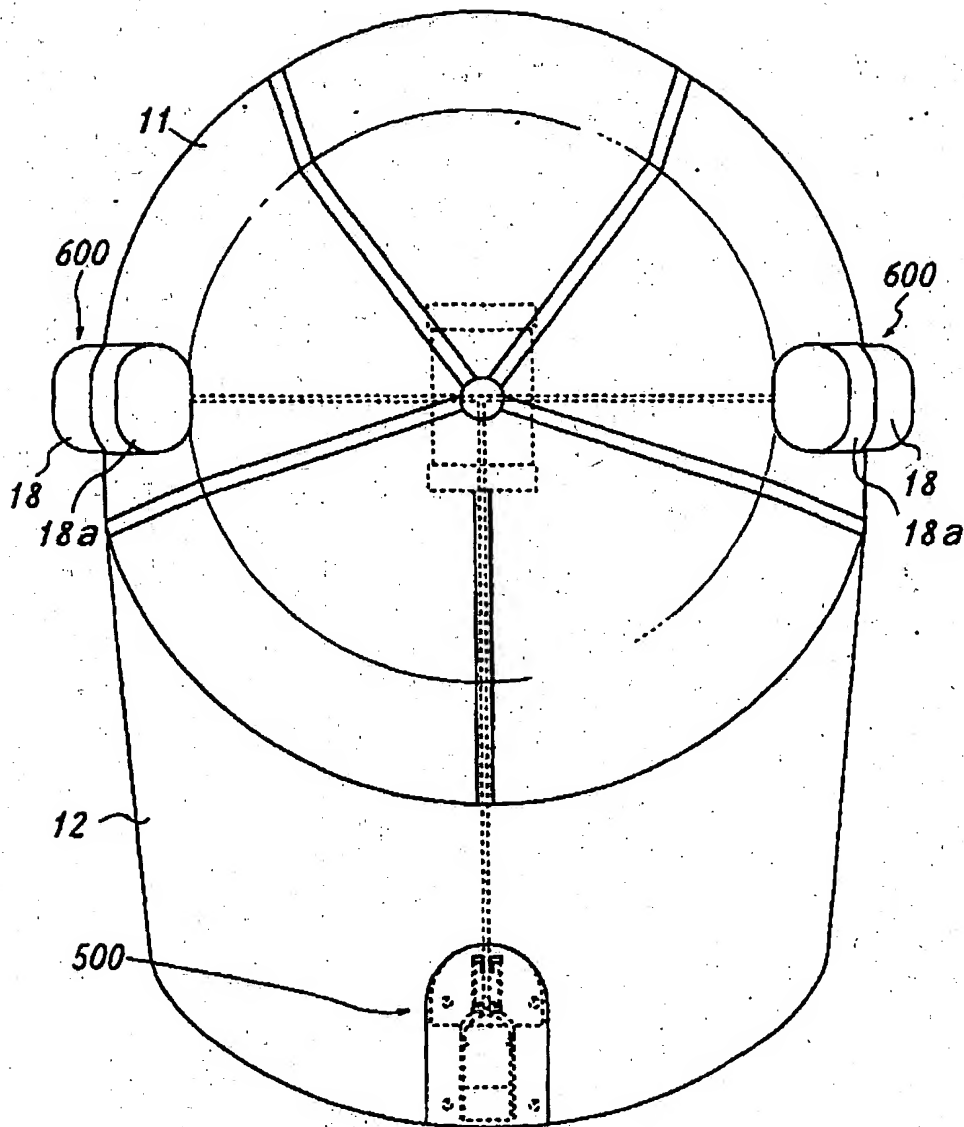
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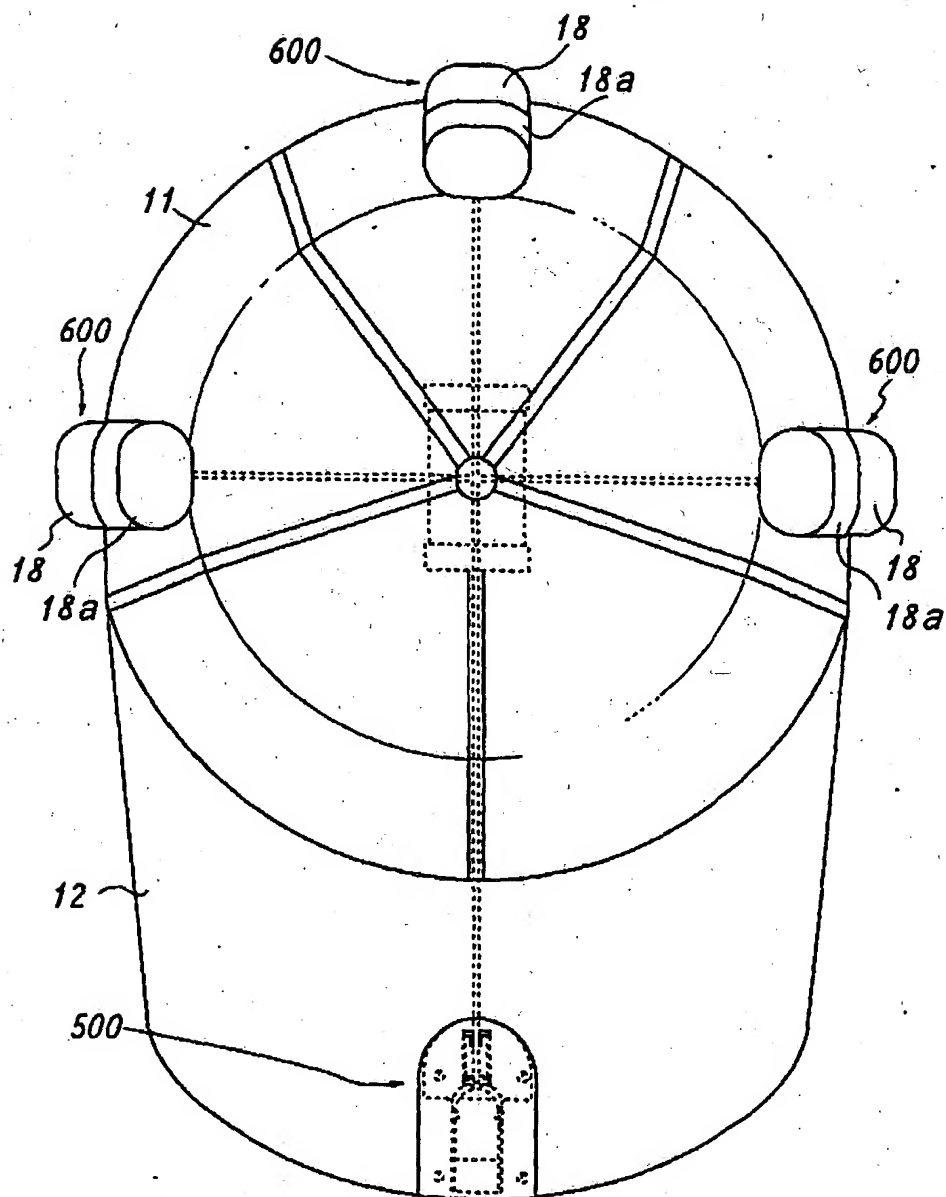
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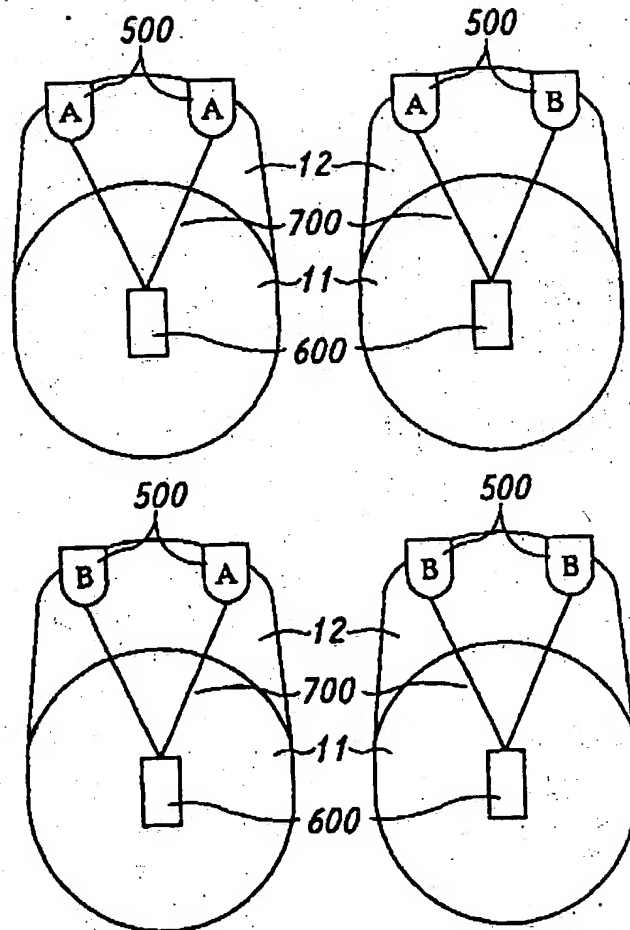
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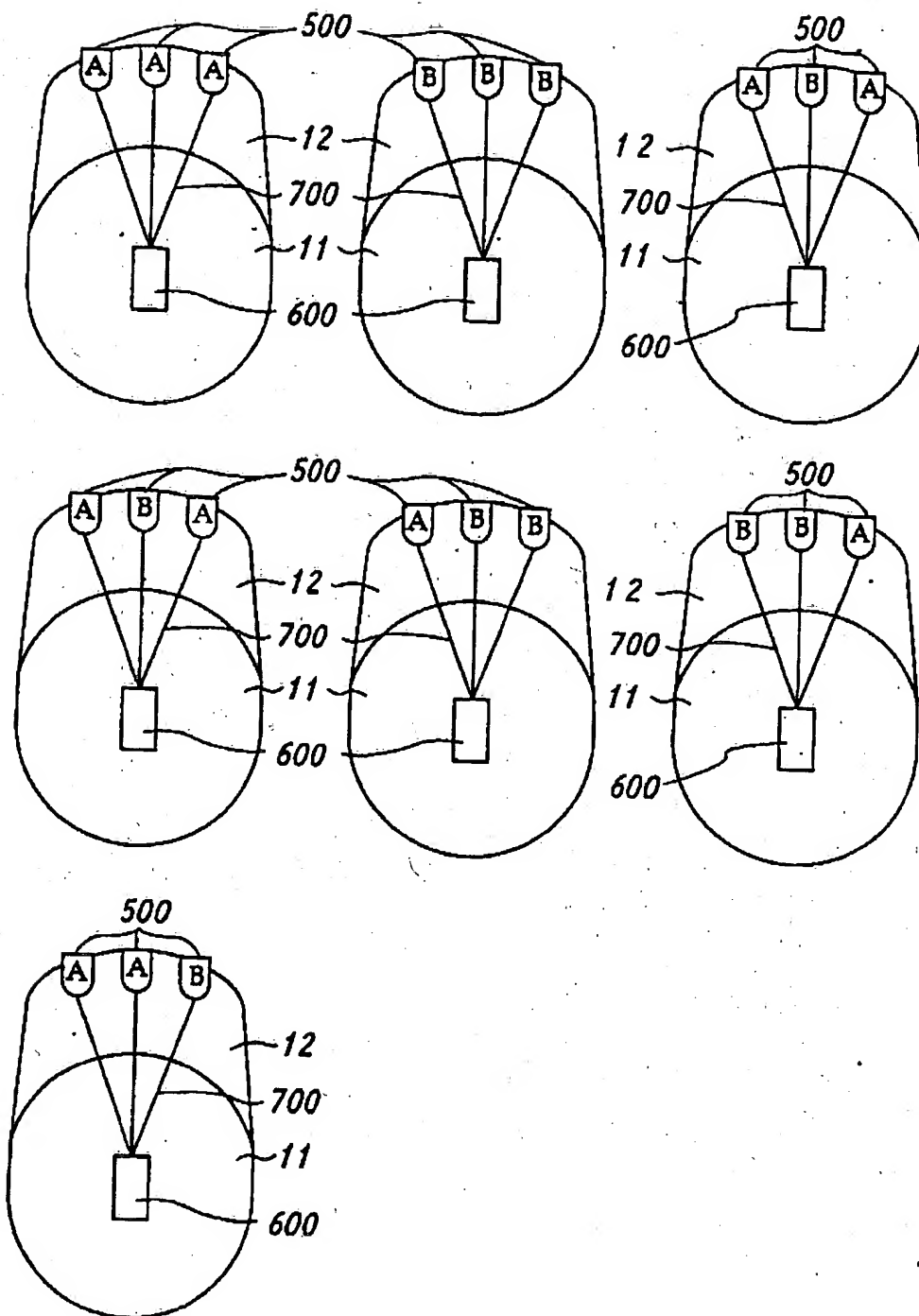
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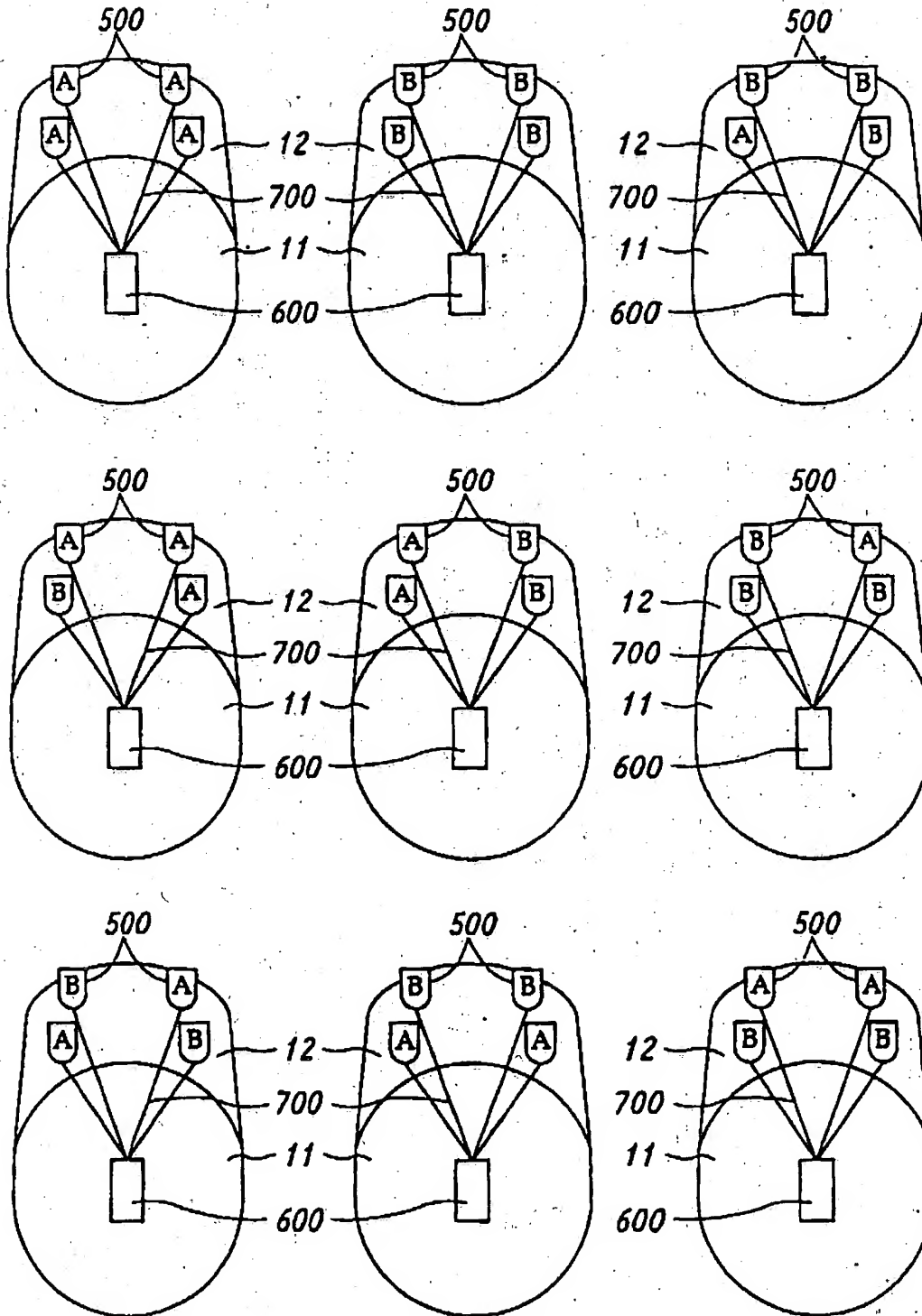
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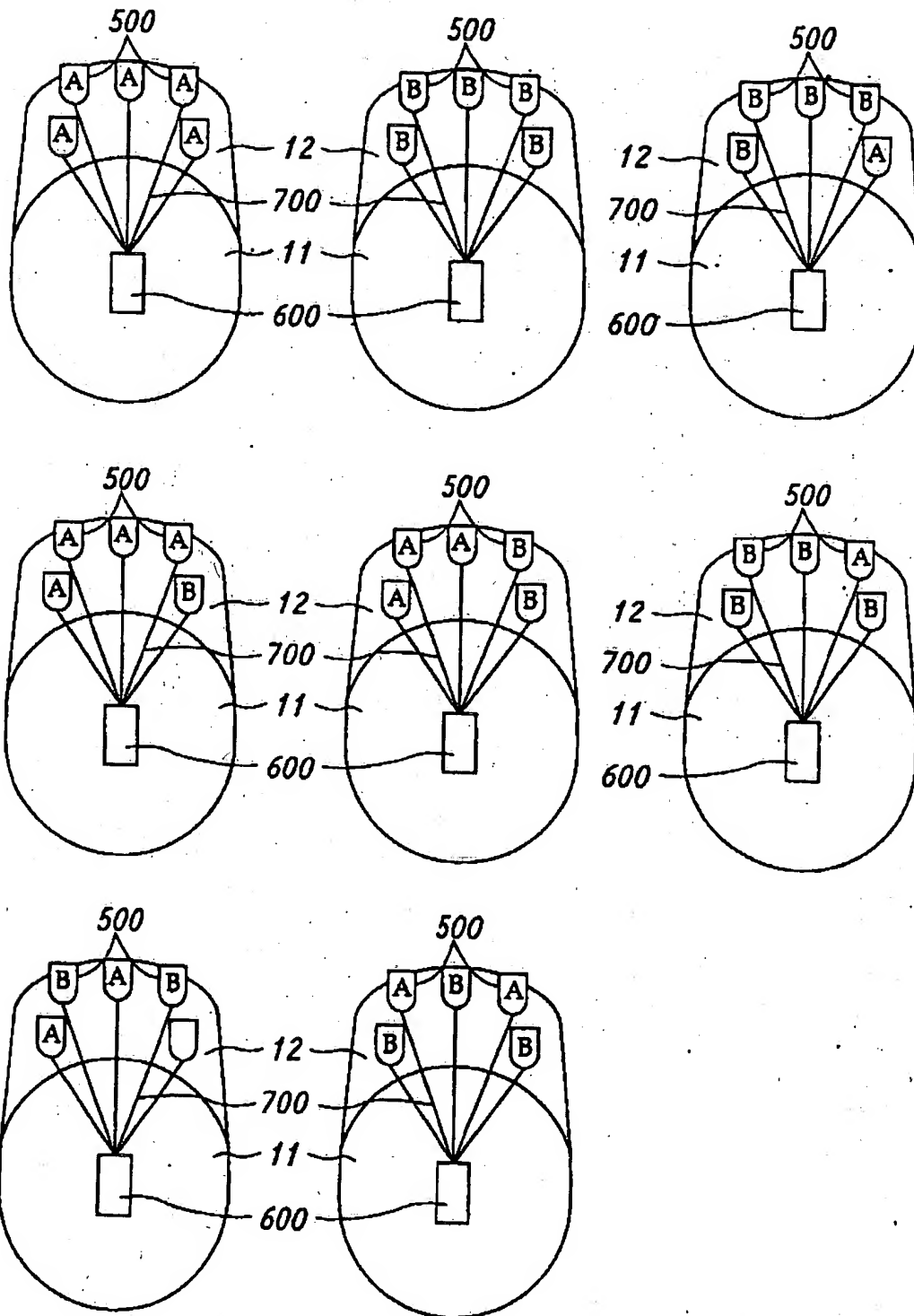
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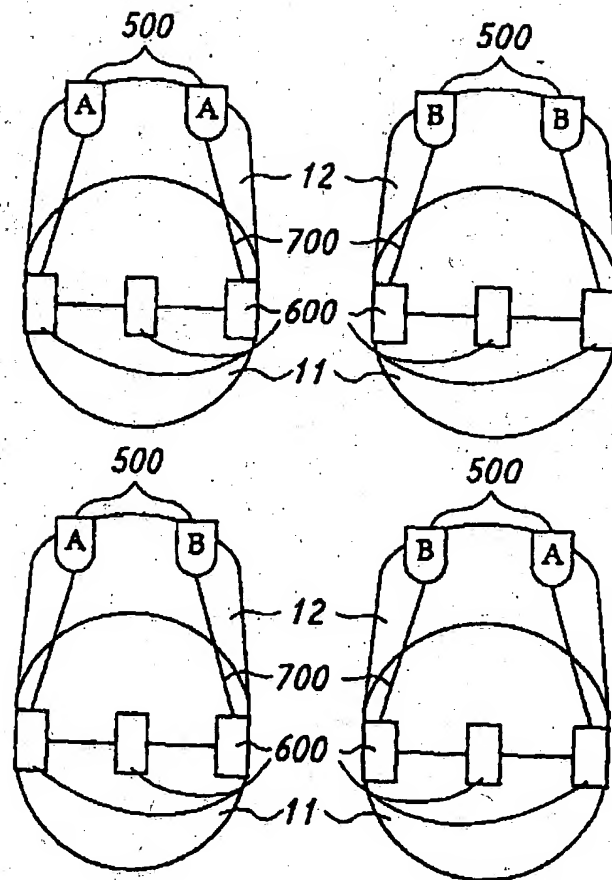


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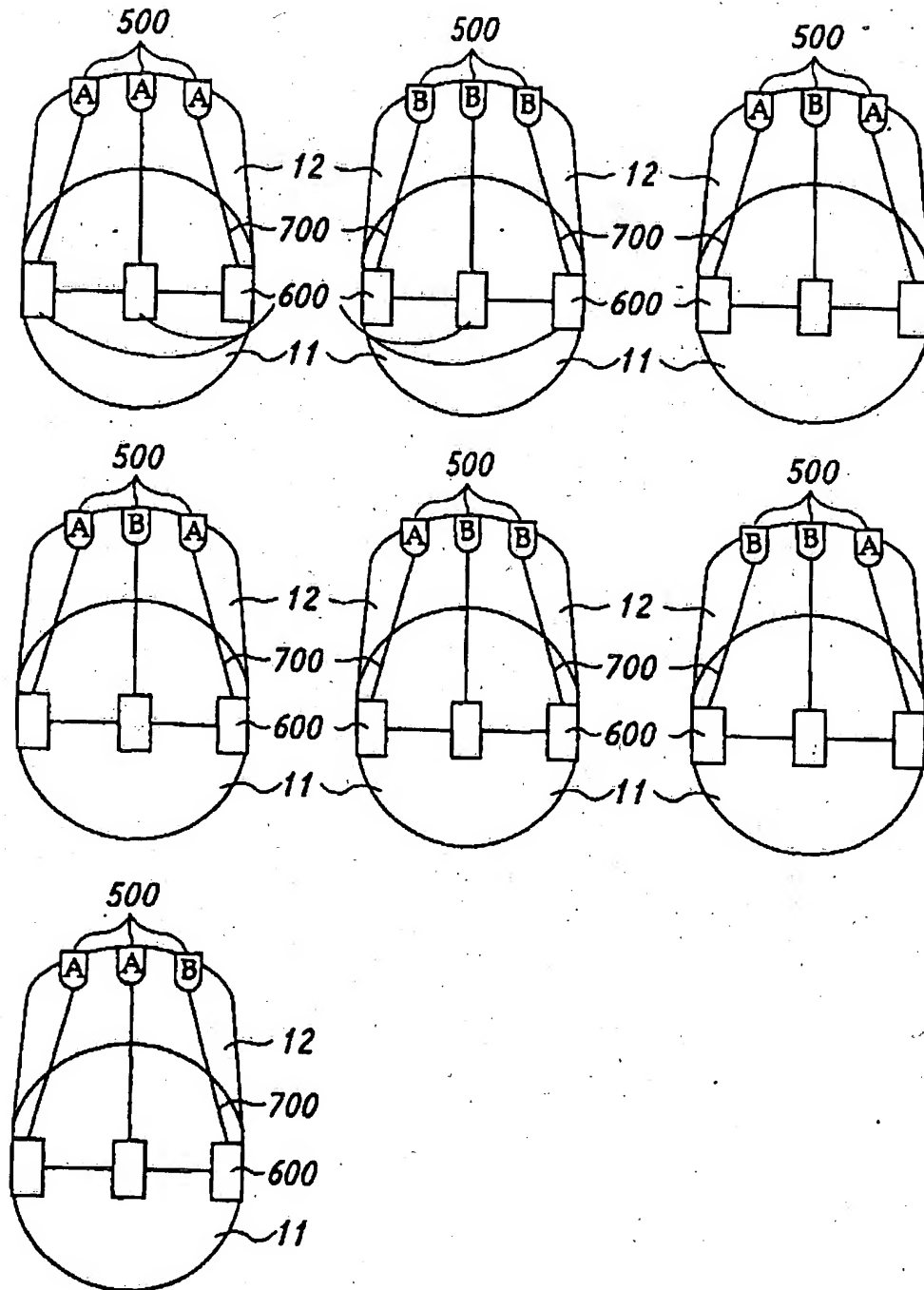




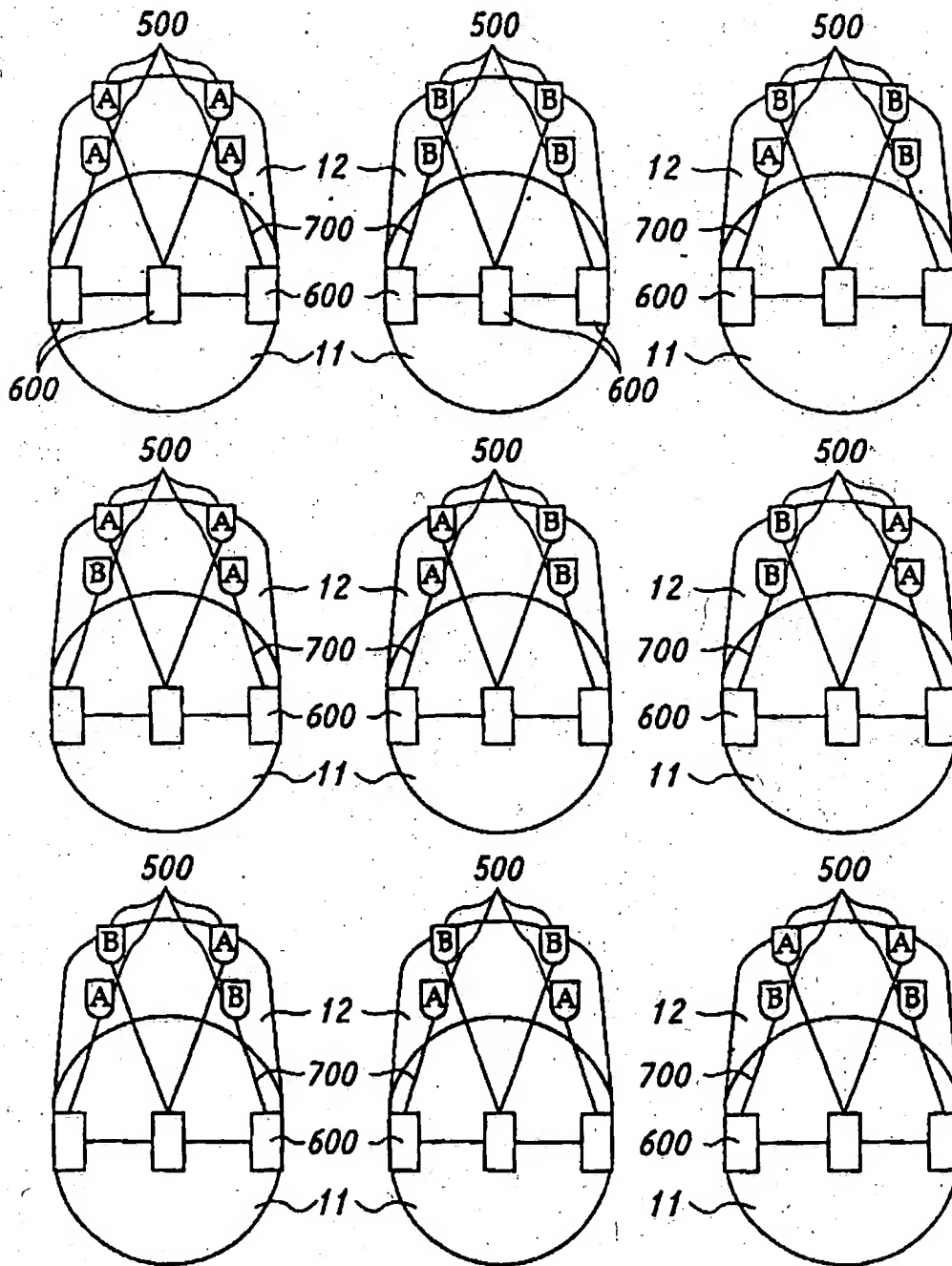
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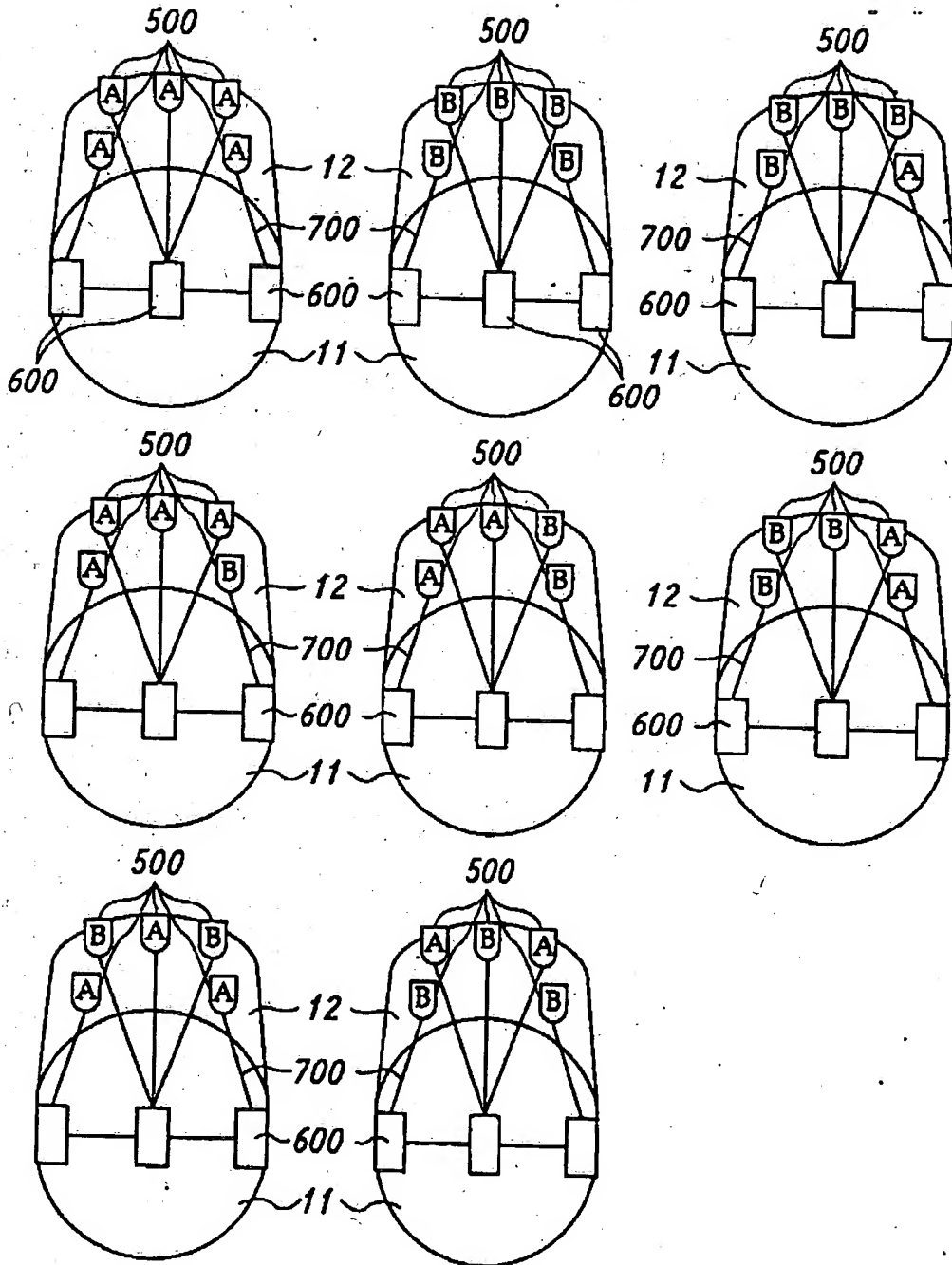
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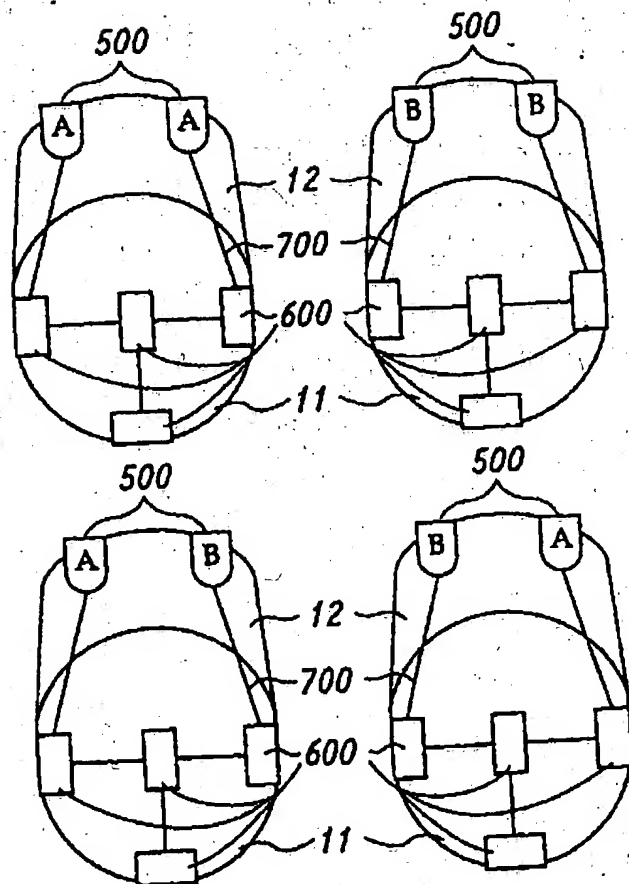
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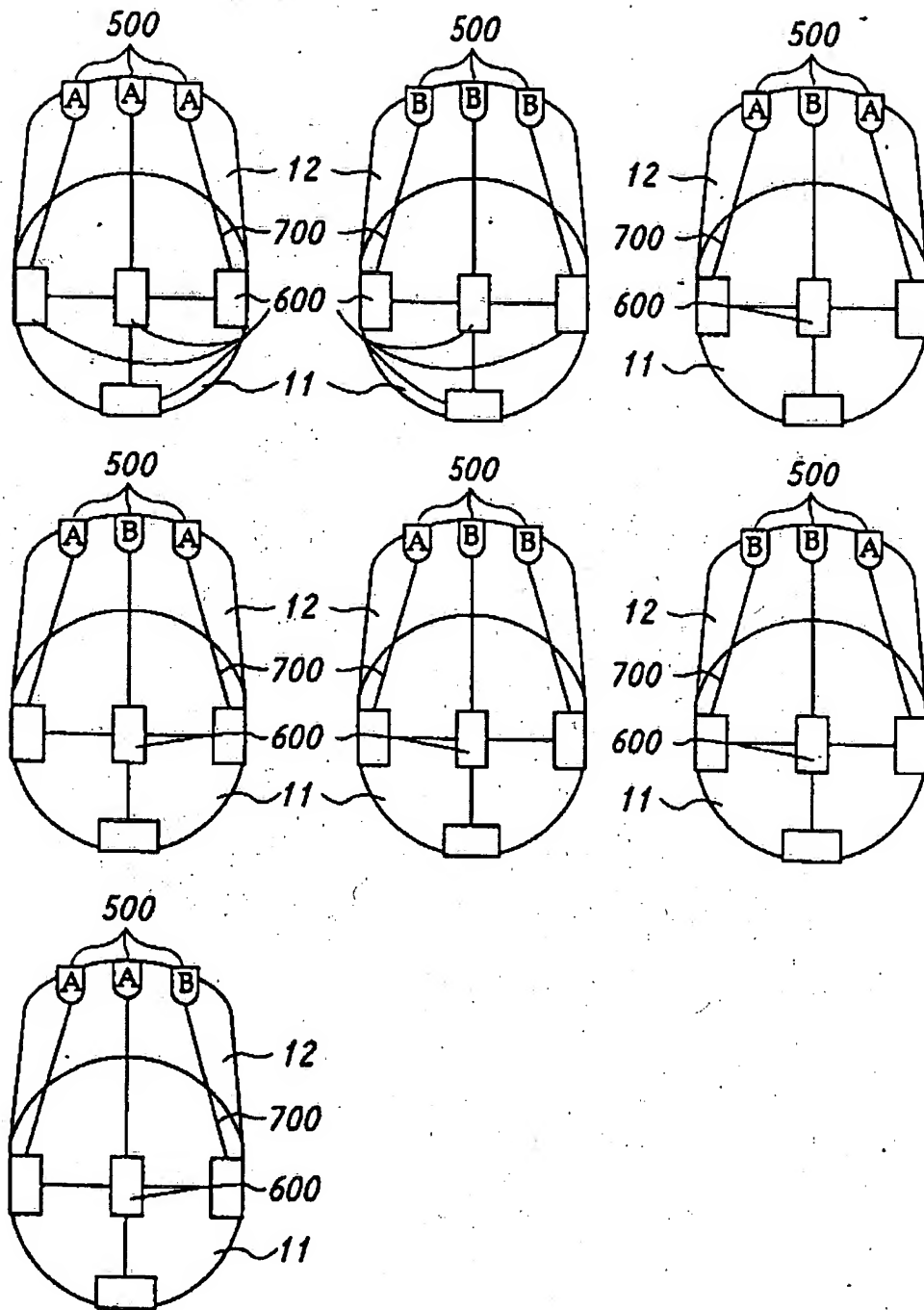
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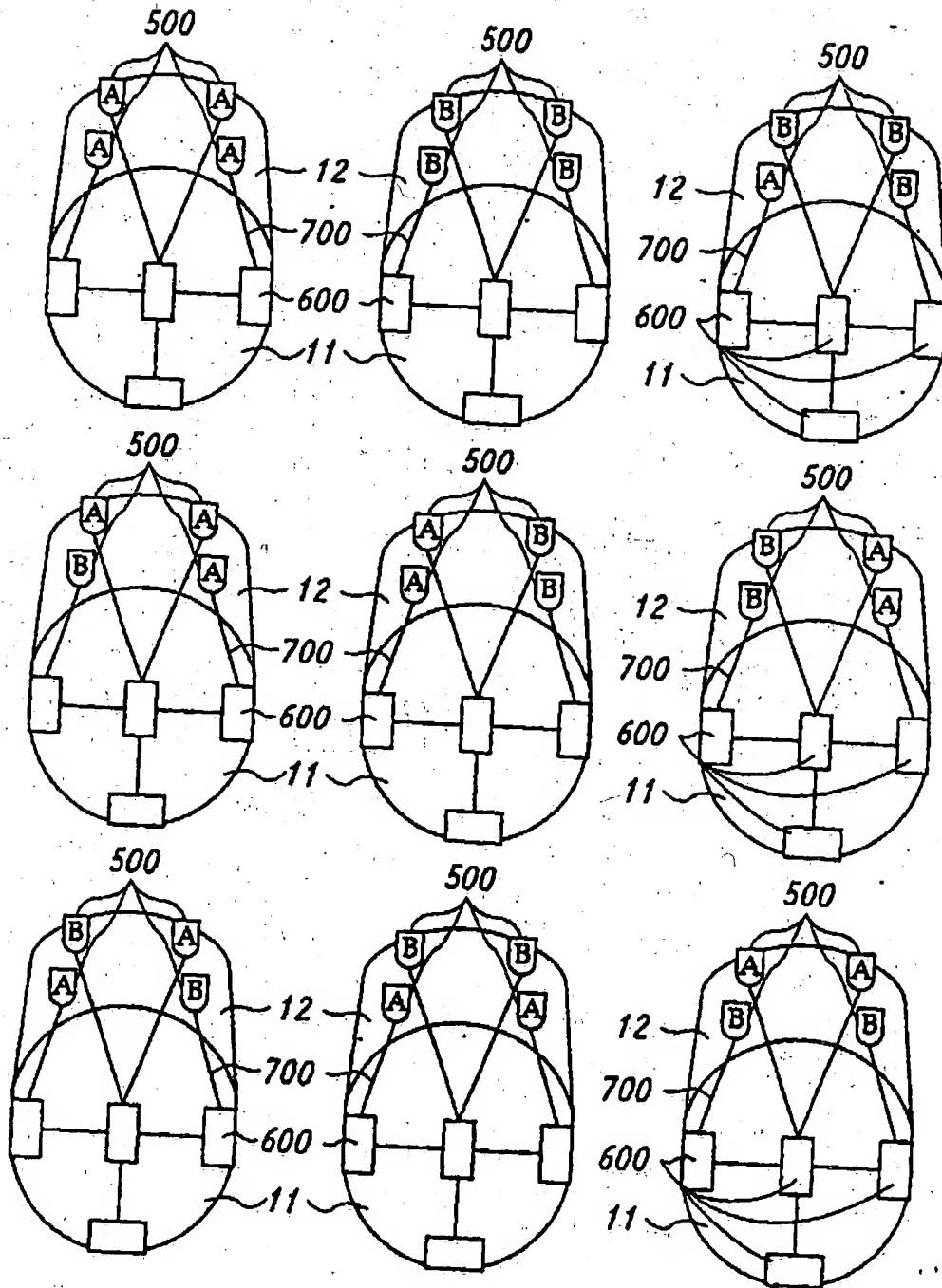
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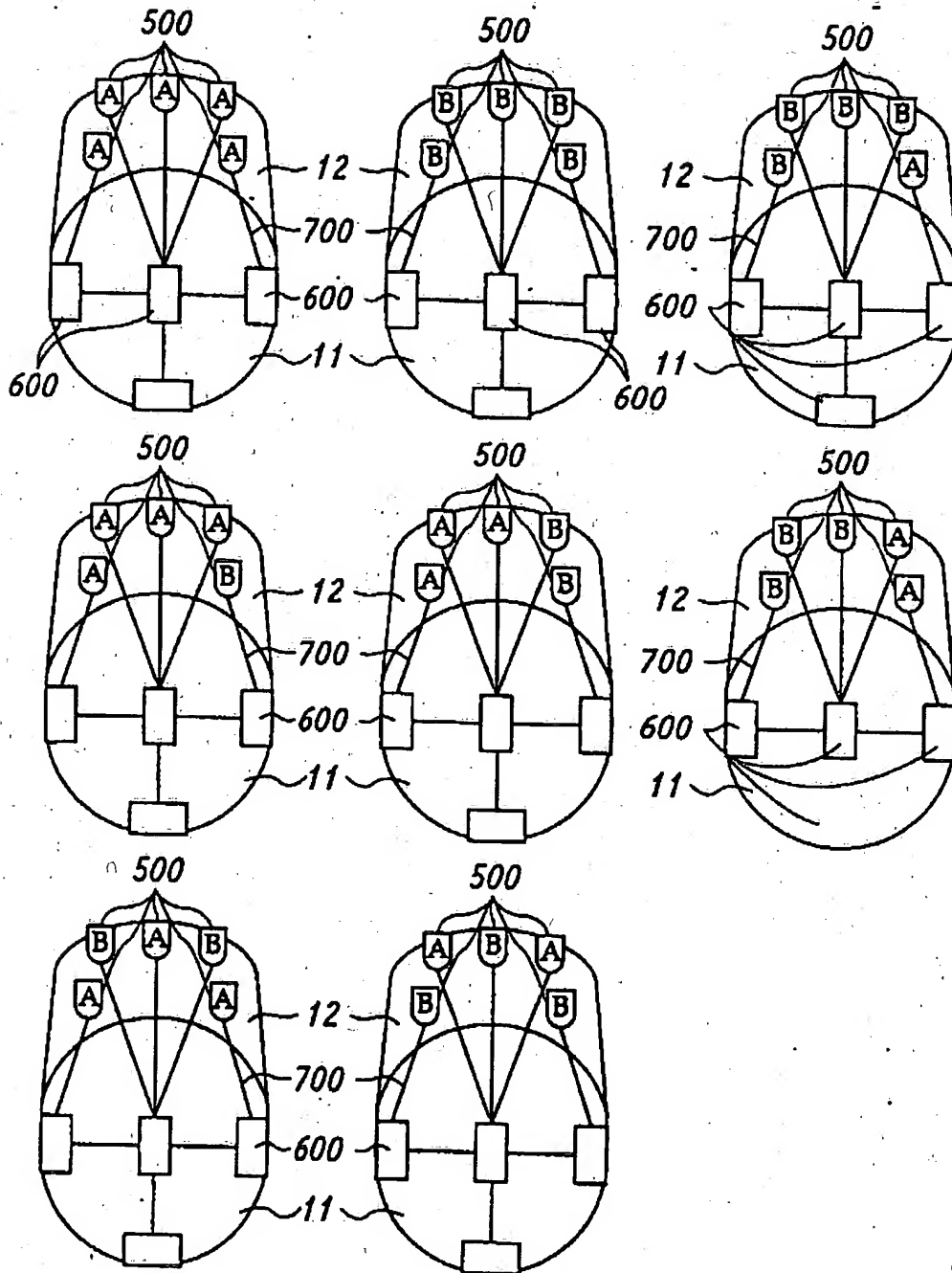
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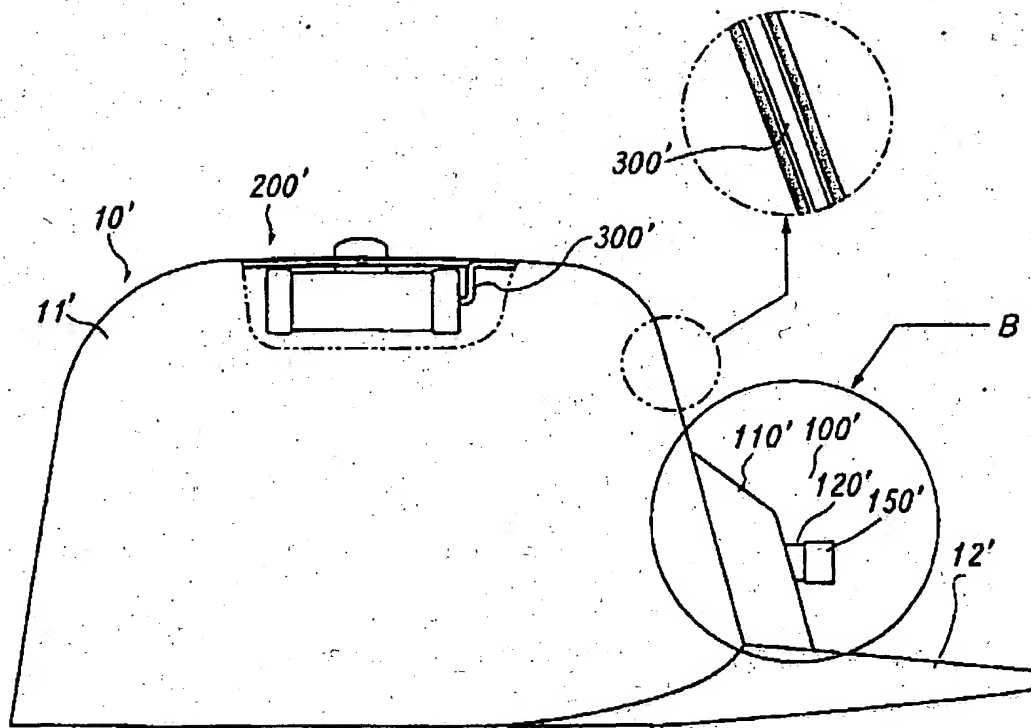


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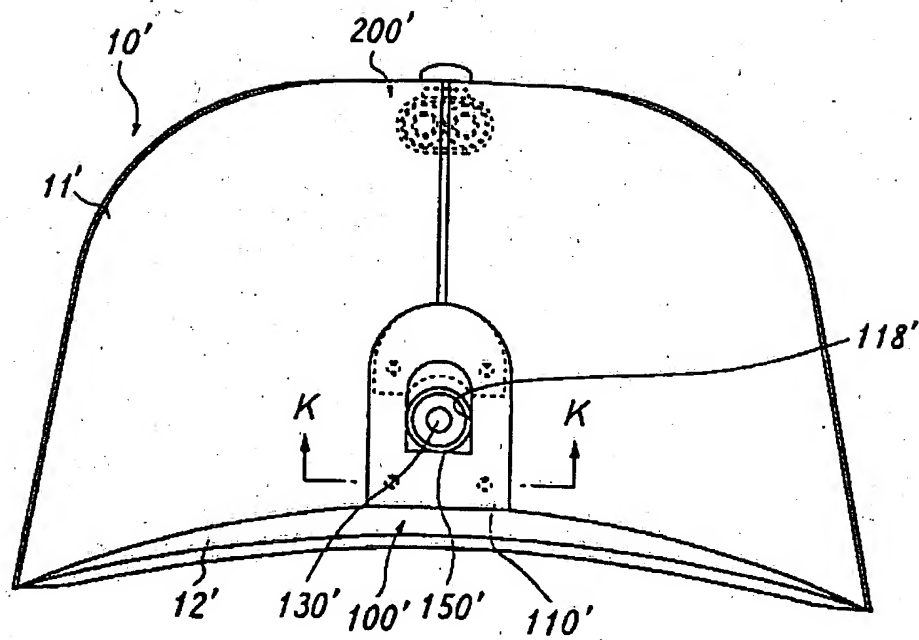




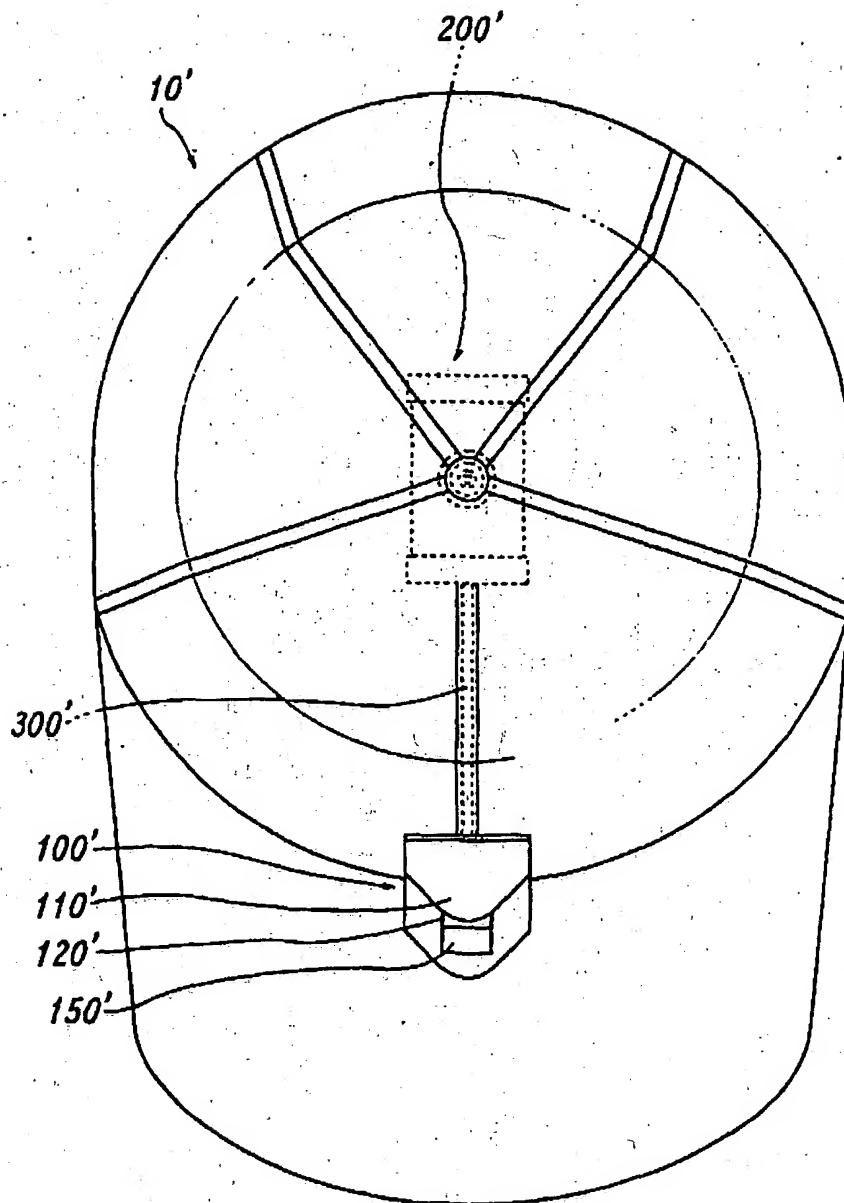
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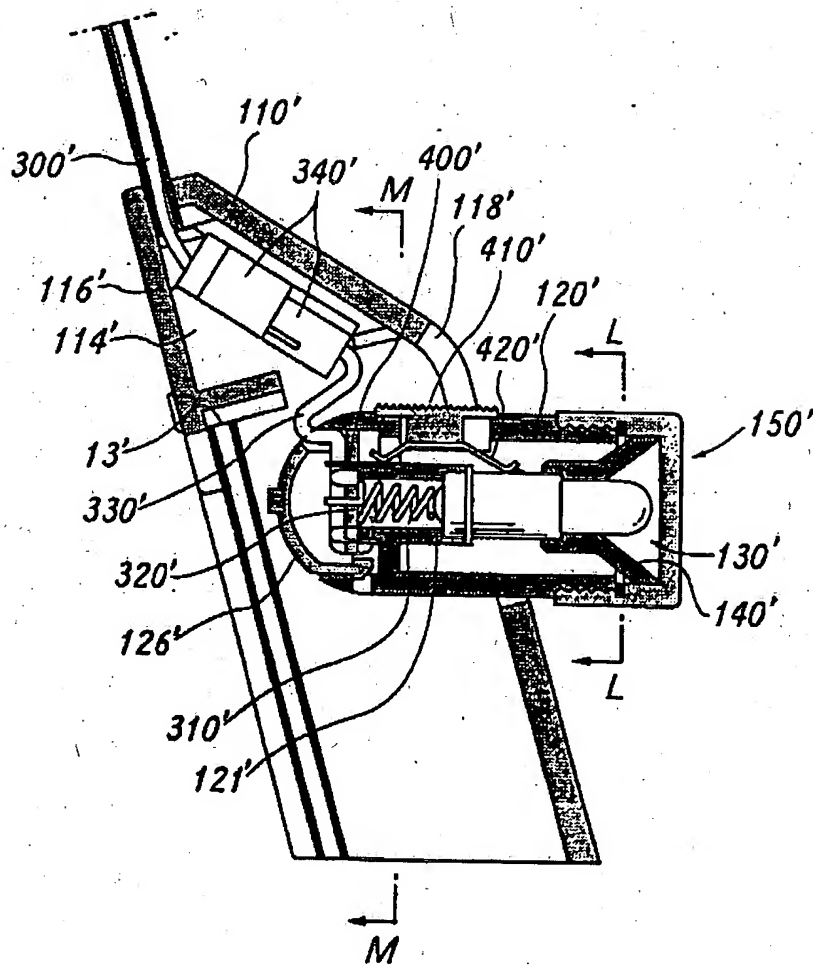
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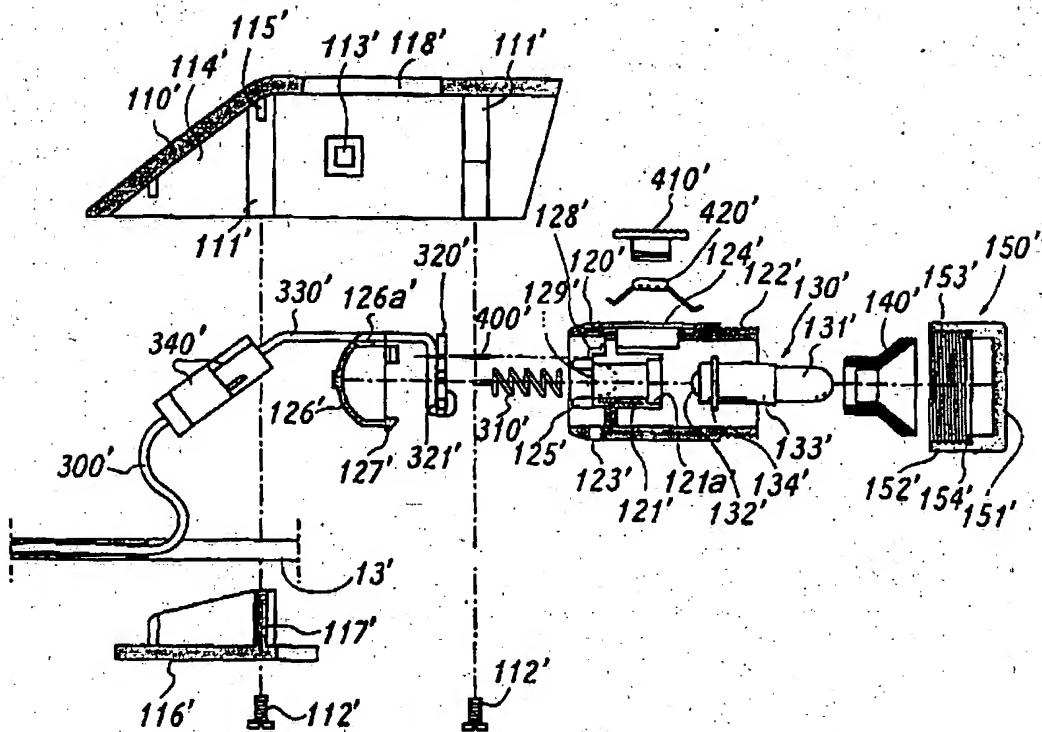
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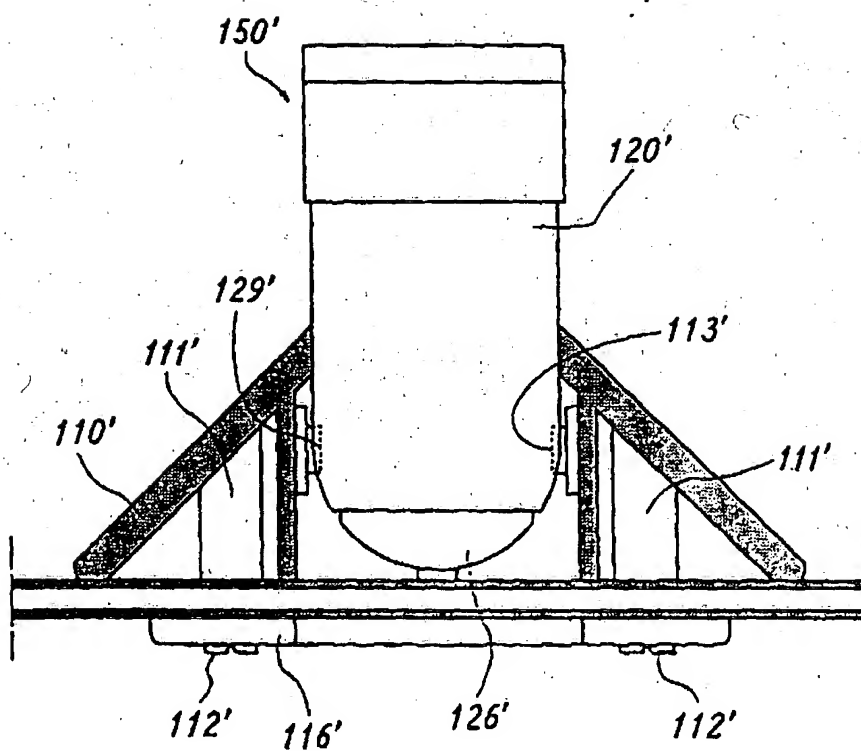
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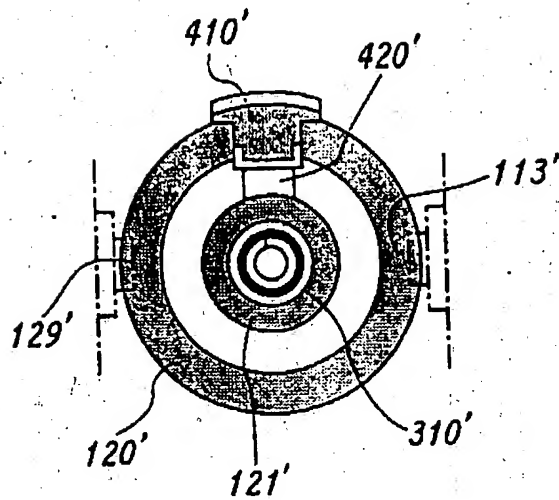


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